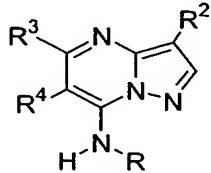


CLAIMS

What is claimed is:

1. A compound represented by the structural formula:



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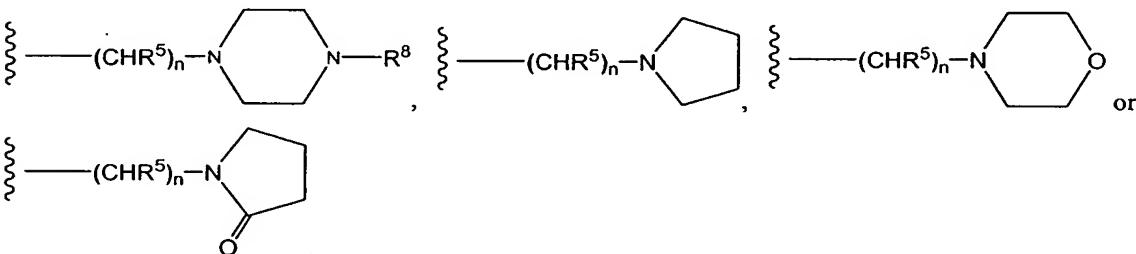
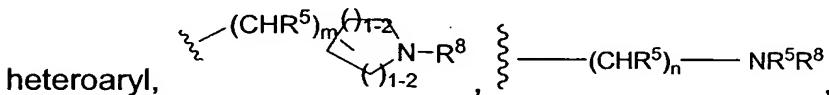
or a pharmaceutically acceptable salt or solvate of said compound,

wherein:

R is H, alkyl, alkenyl, alkynyl, arylalkyl, arylalkenyl, cycloalkyl,

cycloalkylalkyl, alkenylalkyl, alkynylalkyl, heterocyclyl, heterocyclylalkyl,

10 heteroarylalkyl (including N-oxide of said heteroaryl), $-(CHR^5)_n$ -aryl, $-(CHR^5)_n$ -



wherein each of said alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclyl, and

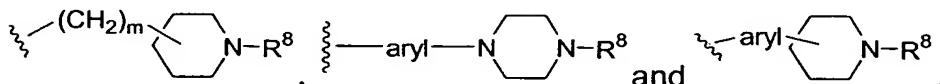
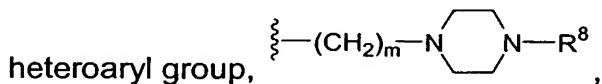
15 heteroaryl can be unsubstituted or optionally substituted with one or more moieties which can be the same or different, each moiety being independently selected from the group consisting of halogen, alkyl, aryl, cycloalkyl, heterocyclylalkyl, CF_3 , OCF_3 , CN , $-OR^5$, $-NR^5R^{10}$, $-C(R^4R^5)_pR^9$, $-N(R^5)Boc$, $-(CR^4R^5)_pOR^5$, $-C(O_2)R^5$, $-C(O)R^5$, $-C(O)NR^5R^{10}$, $-SO_3H$, $-SR^{10}$, $-S(O_2)R^7$, $-S(O_2)NR^5R^{10}$, $-N(R^5)S(O_2)R^7$, $-N(R^5)C(O)R^7$ and $-N(R^5)C(O)NR^5R^{10}$;

20 R^2 is selected from the group consisting of R^9 , alkyl, alkenyl, alkynyl, CF_3 , heterocyclyl, heterocyclylalkyl, halogen, haloalkyl, aryl, arylalkyl, heteroarylalkyl, alkynylalkyl, cycloalkyl, heteroaryl, alkyl substituted with 1-6 R^9 groups which can be the same or different and are independently selected from the list of R^9

25 shown below, aryl substituted with 1-3 aryl or heteroaryl groups which can be the

same or different and are independently selected from phenyl, pyridyl, thiophenyl, furanyl and thiazolo groups, aryl fused with an aryl or heteroaryl group, heteroaryl substituted with 1-3 aryl or heteroaryl groups which can be the same or different and are independently selected from phenyl, pyridyl,

5 thiophenyl, furanyl and thiazolo groups, heteroaryl fused with an aryl or

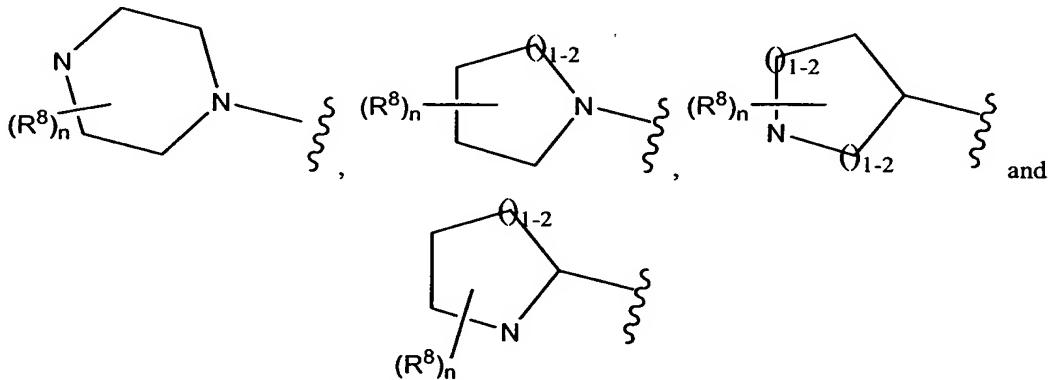


wherein one or more of the aryl and/or one or more of the heteroaryl in

10 the above-noted definitions for R² can be unsubstituted or optionally substituted with one or more moieties which can be the same or different, each moiety being independently selected from the group consisting of halogen, -CN, -OR⁵, -SR⁵, -S(O₂)R⁶, -S(O₂)NR⁵R⁶, -NR⁵R⁶, -C(O)NR⁵R⁶, CF₃, alkyl, aryl and OCF₃;

R³ is selected from the group consisting of H, halogen, -NR⁵R⁶, -OR⁶,

15 -SR⁶, -C(O)N(R⁵R⁶), alkyl, alkynyl, cycloalkyl, aryl, arylalkyl, heterocyclyl, heterocyclylalkyl, heteroaryl and heteroarylalkyl,



wherein each of said alkyl, cycloalkyl, aryl, arylalkyl, heterocyclyl,

20 heterocyclylalkyl, heteroaryl and heteroarylalkyl for R³ and the heterocyclyl moieties whose structures are shown immediately above for R³ can be unsubstituted or optionally independently substituted with one or more moieties which can be the same or different, each moiety being independently selected from the group consisting of halogen, alkyl, aryl, cycloalkyl, CF₃, CN, -OCF₃,

$-(CR^4R^5)_pOR^5$, $-OR^5$, $-NR^5R^6$, $-(CR^4R^5)_pNR^5R^6$, $-C(O_2)R^5$, $-C(O)R^5$, $-C(O)NR^5R^6$, $-SR^6$, $-S(O_2)R^6$, $-S(O_2)NR^5R^6$, $-N(R^5)S(O_2)R^7$, $-N(R^5)C(O)R^7$ and $-N(R^5)C(O)NR^5R^6$, with the proviso that no carbon adjacent to a nitrogen atom on a heterocyclyl ring carries a $-OR^5$ moiety;

- 5 R^4 is H, halo or alkyl;
- R^5 is H, alkyl, aryl or cycloalkyl;
- R^6 is selected from the group consisting of H, alkyl, alkenyl, aryl, arylalkyl, arylalkenyl, cycloalkyl, heterocyclyl, heterocyclylalkyl, heteroaryl, and heteroarylalkyl, wherein each of said alkyl, aryl, arylalkyl, cycloalkyl, heterocyclyl,
- 10 heterocyclylalkyl, heteroaryl, and heteroarylalkyl can be unsubstituted or optionally substituted with one or more moieties which can be the same or different, each moiety being independently selected from the group consisting of halogen, alkyl, aryl, cycloalkyl, heterocyclylalkyl, CF_3 , OCF_3 , CN , $-OR^5$, $-NR^5R^{10}$, $-C(R^4R^5)_pR^9$, $-N(R^5)Boc$, $-(CR^4R^5)_pOR^5$, $-C(O_2)R^5$, $-C(O)R^5$, $-C(O)NR^5R^{10}$,
- 15 $-SO_3H$, $-SR^{10}$, $-S(O_2)R^7$, $-S(O_2)NR^5R^{10}$, $-N(R^5)S(O_2)R^7$, $-N(R^5)C(O)R^7$ and $-N(R^5)C(O)NR^5R^{10}$;
- R^{10} is selected from the group consisting of H, alkyl, aryl, arylalkyl, cycloalkyl, heterocyclyl, heterocyclylalkyl, heteroaryl, and heteroarylalkyl, wherein each of said alkyl, aryl, arylalkyl, cycloalkyl, heterocyclyl,
- 20 heterocyclylalkyl, heteroaryl, and heteroarylalkyl can be unsubstituted or optionally substituted with one or more moieties which can be the same or different, each moiety being independently selected from the group consisting of halogen, alkyl, aryl, cycloalkyl, heterocyclylalkyl, CF_3 , OCF_3 , CN , $-OR^5$, $-NR^4R^5$, $-C(R^4R^5)_pR^9$, $-N(R^5)Boc$, $-(CR^4R^5)_pOR^5$, $-C(O_2)R^5$, $-C(O)NR^4R^5$, $-C(O)R^5$,
- 25 $-SO_3H$, $-SR^5$, $-S(O_2)R^7$, $-S(O_2)NR^4R^5$, $-N(R^5)S(O_2)R^7$, $-N(R^5)C(O)R^7$ and $-N(R^5)C(O)NR^4R^5$;
- or optionally (i) R^5 and R^{10} in the moiety $-NR^5R^{10}$, or (ii) R^5 and R^6 in the moiety $-NR^5R^6$, may be joined together to form a cycloalkyl or heterocyclyl moiety, with each of said cycloalkyl or heterocyclyl moiety being unsubstituted or
- 30 optionally independently being substituted with one or more R^9 groups;
- R^7 is selected from the group consisting of alkyl, cycloalkyl, aryl, arylalkenyl, heteroaryl, arylalkyl, heteroarylalkyl, heteroarylalkenyl, and

heterocyclyl, wherein each of said alkyl, cycloalkyl, heteroarylalkyl, aryl, heteroaryl and arylalkyl can be unsubstituted or optionally independently substituted with one or more moieties which can be the same or different, each moiety being independently selected from the group consisting of halogen, alkyl,

- 5 aryl, cycloalkyl, CF₃, OCF₃, CN, -OR⁵, -NR⁵R¹⁰, -CH₂OR⁵,
 -C(O₂)R⁵, -C(O)NR⁵R¹⁰, -C(O)R⁵, -SR¹⁰, -S(O₂)R¹⁰, -S(O₂)NR⁵R¹⁰,
 -N(R⁵)S(O₂)R¹⁰, -N(R⁵)C(O)R¹⁰ and -N(R⁵)C(O)NR⁵R¹⁰;
- 10 R⁸ is selected from the group consisting of R⁶, -OR⁶, -C(O)NR⁵R¹⁰,
 -S(O₂)NR⁵R¹⁰, -C(O)R⁷, -C(=N-CN)-NH₂, -C(=NH)-NHR⁵, heterocyclyl, and
 -S(O₂)R⁷;

R⁹ is selected from the group consisting of halogen, -CN, -NR⁵R¹⁰,
 -C(O₂)R⁶, -C(O)NR⁵R¹⁰, -OR⁶, -SR⁶, -S(O₂)R⁷, -S(O₂)NR⁵R¹⁰, -N(R⁵)S(O₂)R⁷,
 -N(R⁵)C(O)R⁷ and -N(R⁵)C(O)NR⁵R¹⁰;

m is 0 to 4;

15 n is 1 to 4; and

p is 1 to 4,

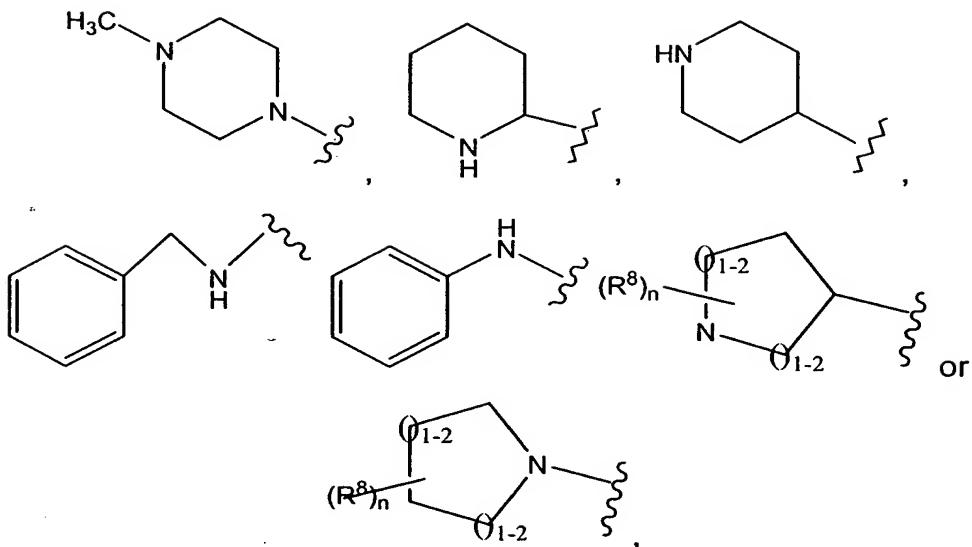
with the proviso that when R² is phenyl, R³ is not alkyl, alkynyl or halogen, and

that when R² is aryl, R is not $\begin{cases} \text{---} & \text{---} \\ \text{---} & \text{---} \end{cases}$ (CHR⁵)_n NR⁵R⁸, and with the further proviso
 that when R is arylalkyl, then any heteroaryl substituent on the aryl of said
 20 arylalkyl contains at least three heteroatoms.

2. The compound of claim 1, wherein R is -(CHR⁵)_n-aryl, -(CHR⁵)_n-
 heteroaryl, alkyl, cycloalkyl, heterocyclyl, or heteroarylalkyl (including N-oxide of
 said heteroaryl), wherein each of said alkyl, aryl, cycloalkyl, heterocyclyl and
 heteroaryl can be unsubstituted or optionally substituted with one or more
 25 moieties as stated in claim 1;

R² is halogen, alkyl, haloalkyl, CN, cycloalkyl, heterocyclyl or alkynyl;

R³ is H, lower alkyl, aryl, heteroaryl, cycloalkyl, -NR⁵R⁶,

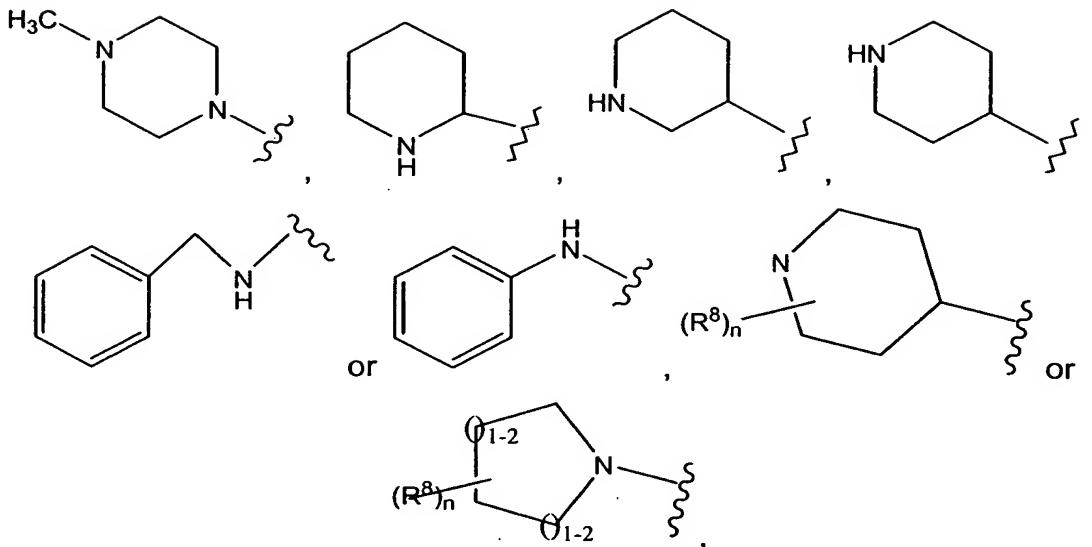


wherein said alkyl, aryl, heteroaryl, cycloalkyl and the heterocyclyl structures shown immediately above for R^3 are optionally substituted with one or more moieties which can be the same or different, each moiety being independently selected from the group consisting of halogen, CF_3 , OCF_3 , lower alkyl, CN, $-C(O)R^5$, $-S(O_2)R^5$, $-C(=NH)-NH_2$, $-C(=CN)-NH_2$, hydroxyalkyl, alkoxycarbonyl, $-SR^5$, and OR^5 , with the proviso that no carbon adjacent to a nitrogen atom on a heterocyclyl ring carries a $-OR^5$ moiety;

10 R^4 is H or lower alkyl;
 R^5 is H, lower alkyl or cycloalkyl;
 n is 1 to 2; and
 p is 1 or 2.

15 3. The compound of claim 2, wherein R is hydroxyalkyl, $-(CHR^5)_n$ -aryl, or $-(CHR^5)_n$ -heteroaryl, wherein each of said aryl and heteroaryl is unsubstituted or substituted with one or more groups which can be the same or different, each group being independently selected from the group consisting of heteroaryl, amine, heterocyclyl, $-C(O)N(R^5R^6)$, $-S(O_2)R^5$, $-S(O_2)N(R^5R^6)$, alkoxy and halo.

20 4. The compound of claim 2, wherein R^2 is Br, Cl, CF_3 , CN, lower alkyl, cyclopropyl, alkynyl, alkyl substituted with $-OR^6$ or tetrahydrofuranyl.
5. The compound of claim 2, wherein R^3 is H, lower alkyl, aryl, heteroaryl, cycloalkyl,



wherein each of said alkyl, aryl, heteroaryl, cycloalkyl and the heterocyclyl

5 structures shown immediately above for R³ are optionally substituted with one or more moieties which moieties can be the same or different, each moiety being independently selected from the group consisting of halogen, CF₃, OCF₃, lower alkyl, CN and OR⁵, with the proviso that no carbon adjacent to a nitrogen atom on a heterocycl ring carries a – OR⁵ moiety.

10 6. The compound of claim 2, wherein R⁴ is H or lower alkyl.
7. The compound of claim 2, wherein R⁵ is H.
8. The compound of claim 2, wherein n is 1.
9. The compound of claim 1, wherein p is 1.
10. The compound of claim 2, wherein R is benzyl or hydroxyalkyl.

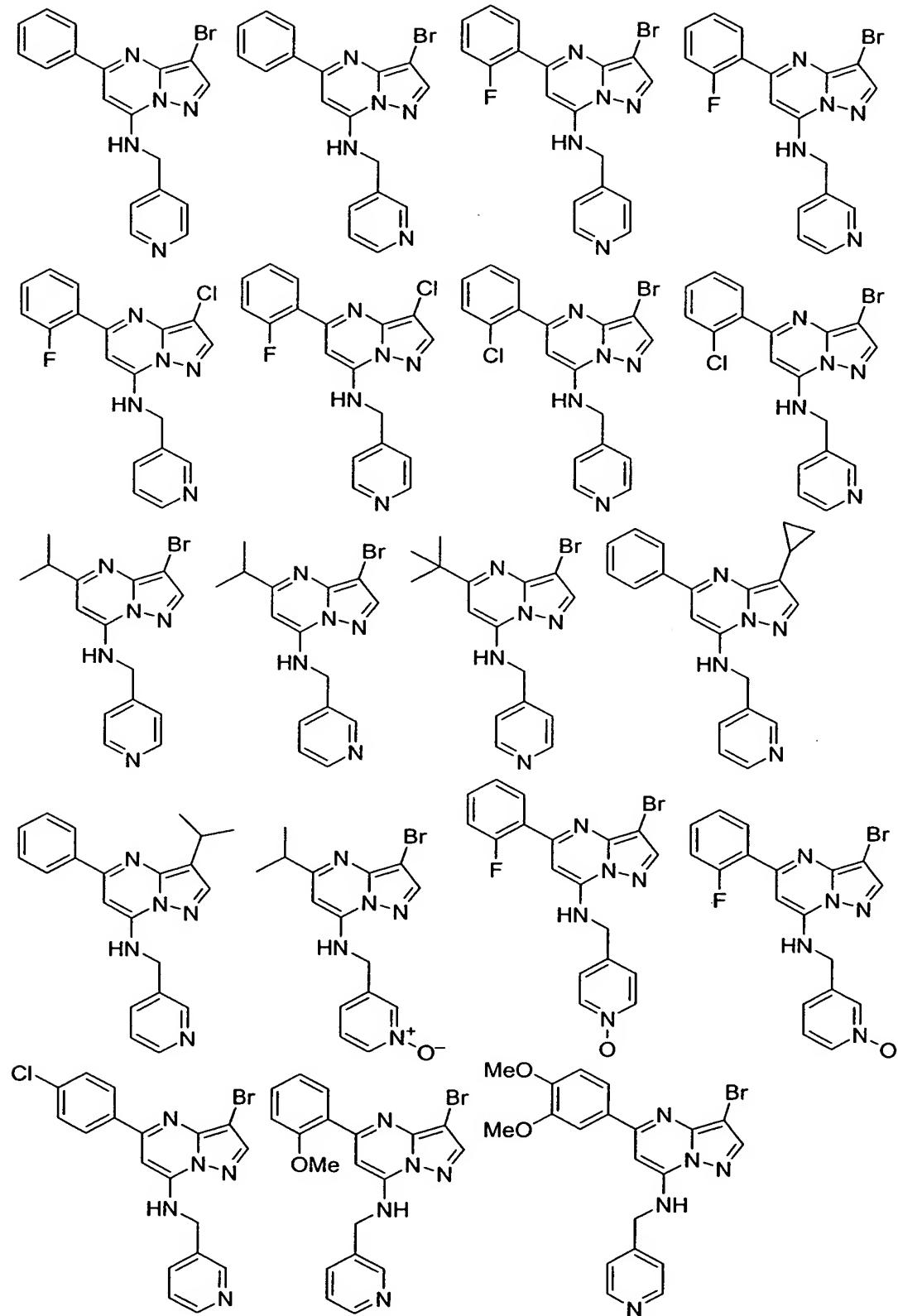
15 11. The compound of claim 2, wherein R is pyrid-3-ylmethyl, wherein said pyridyl may be unsubstituted or optionally independently substituted with one or more moieties as stated in claim 1.
12. The compound of claim 2, wherein R is pyrid-4-ylmethyl, wherein said pyridyl may be unsubstituted or optionally independently substituted with one or more moieties as stated in claim 1.

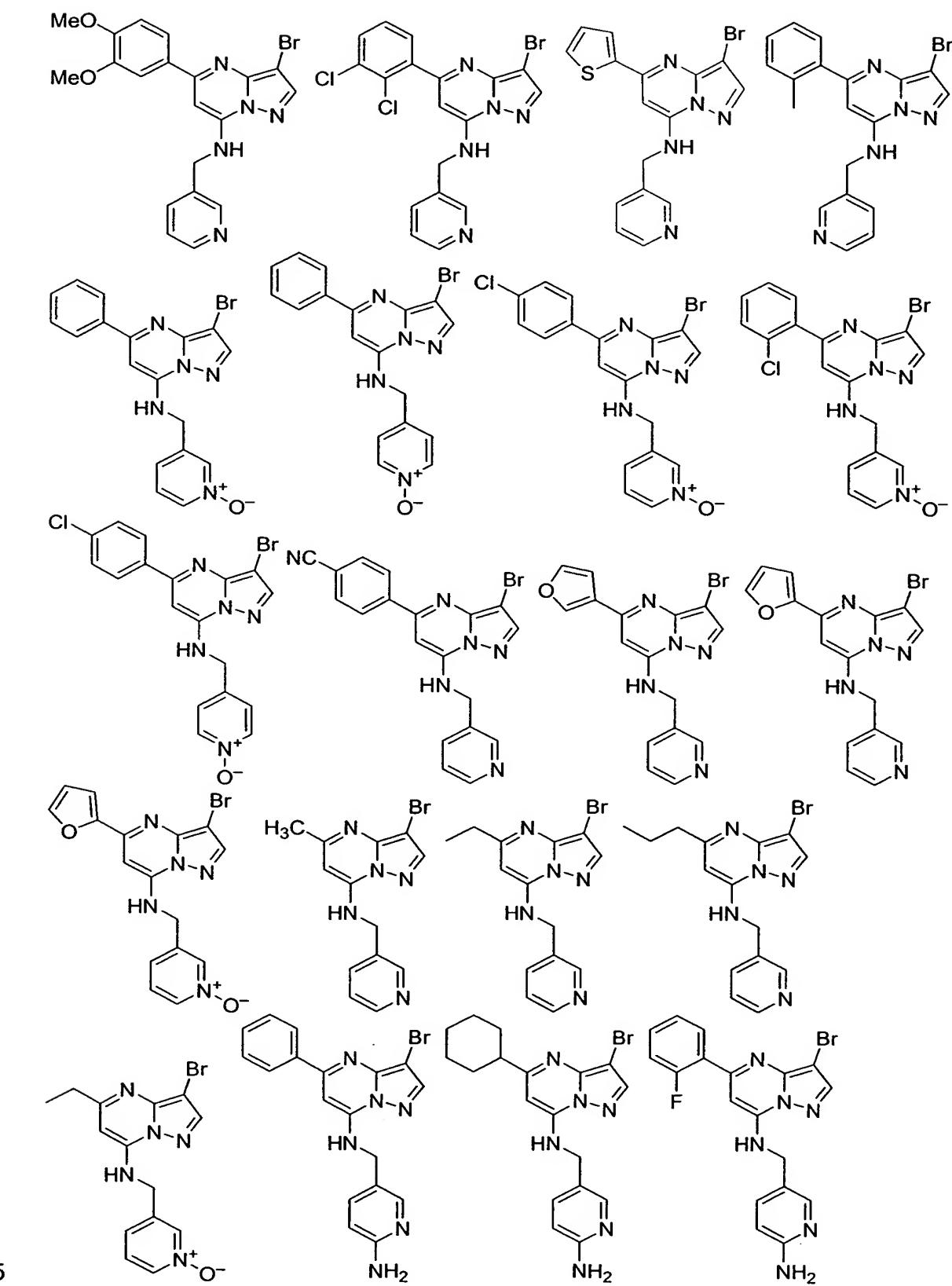
20 13. The compound 2, wherein R is the N-oxide of pyrid-2-ylmethyl, pyrid-3-ylmethyl, or pyrid-4-ylmethyl, wherein each of said pyridyl may be unsubstituted or optionally independently substituted with one or more moieties as stated in claim 1.

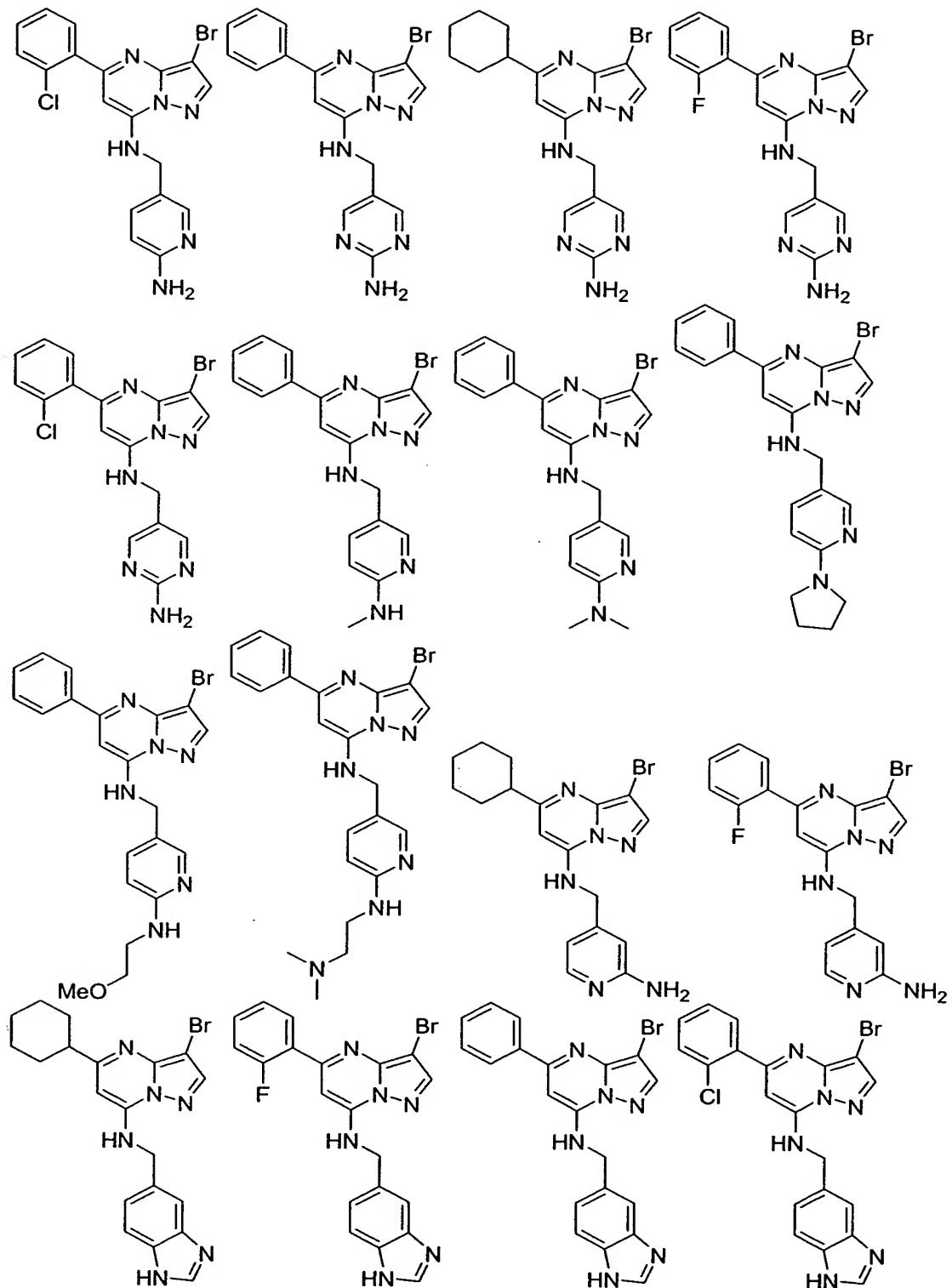
14. The compound of claim 4, wherein said R² is Br.
15. The compound of claim 4, wherein said R² is Cl.
16. The compound of claim 4, wherein R² is ethyl.
17. The compound of claim 4, wherein R² is cyclopropyl.

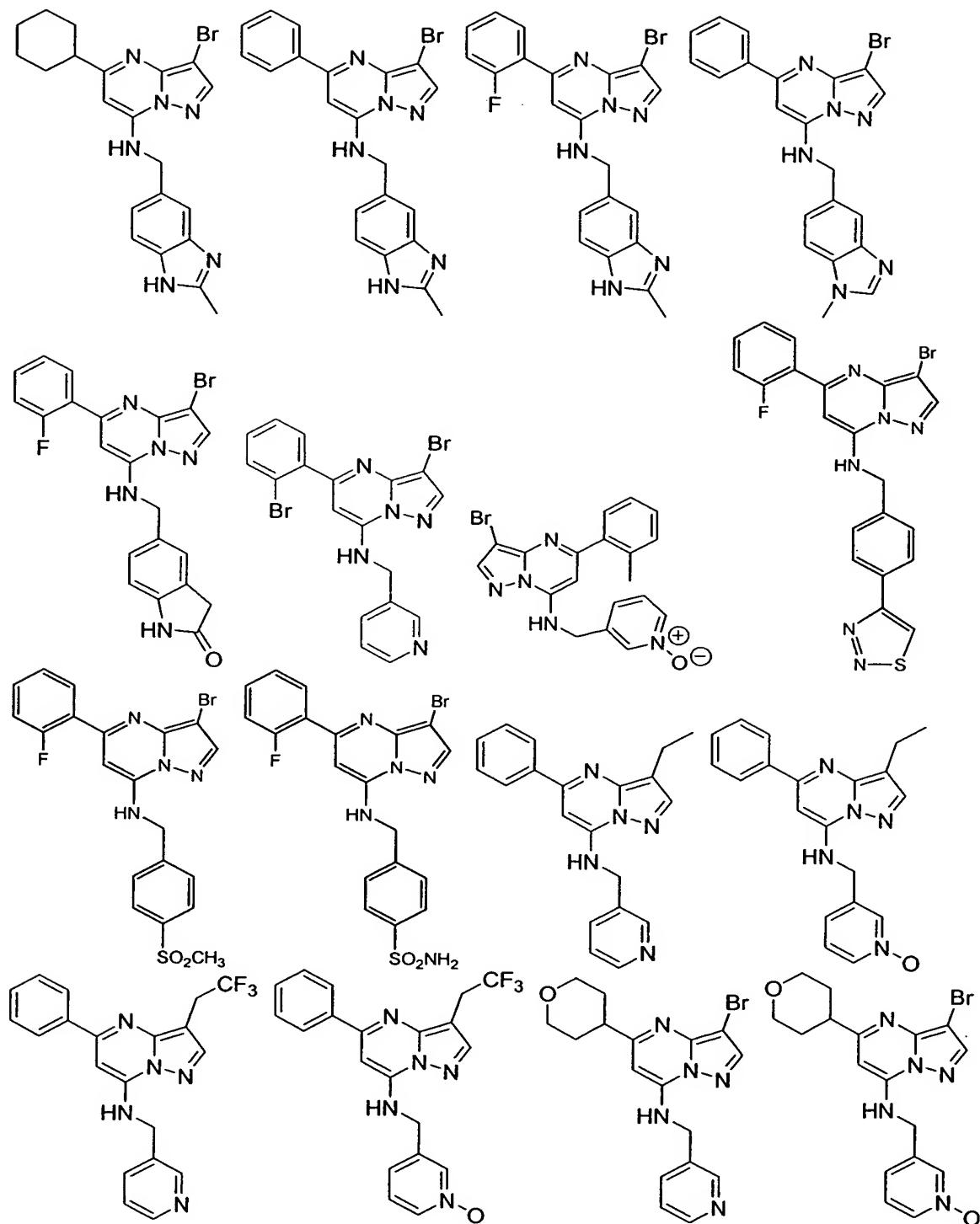
5 18. The compound of claim 4, wherein R² is ethynyl.

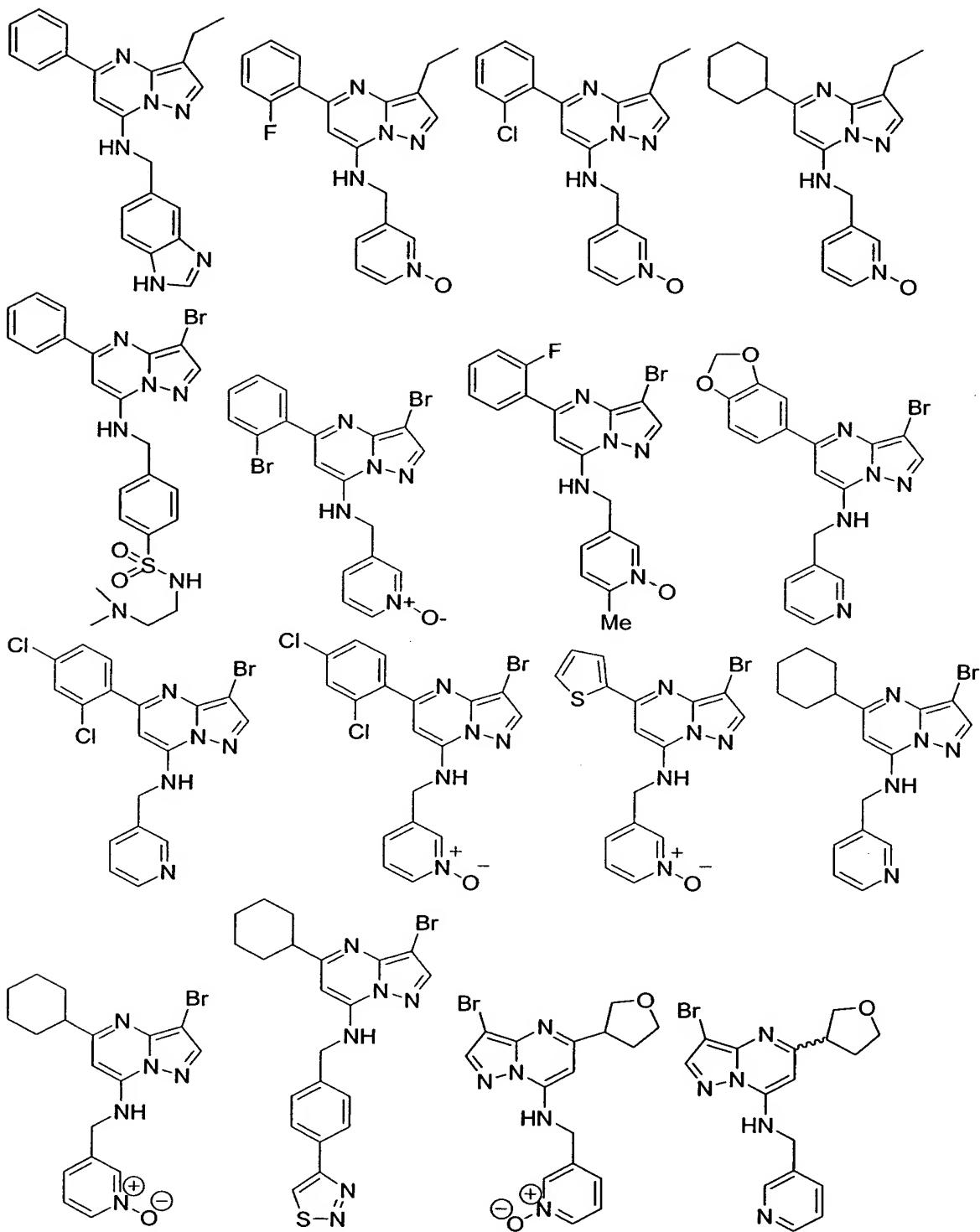
19. The compound of claim 2, wherein R³ is lower alkyl, cycloalkyl, heterocyclyl, aryl or –N(R⁵R⁶).
20. The compound of claim 19, wherein R³ is isopropyl.
21. The compound of claim 19, wherein R³ is cyclohexyl or norbornyl wherein
10 each of said cyclohexyl or norbornyl can be unsubstituted or substituted with one or more moieties which can be the same or different, each moiety being independently selected from the group consisting of alkyl and hydroxyalkyl.
22. The compound of claim 19, wherein R³ is unsubstituted phenyl.
23. The compound of claim 19, wherein R³ is a phenyl substituted with one or
15 moieties which can be the same or different, each moiety being independently selected from the group consisting of F, Br, Cl and CF₃.
24. The compound of claim 19, wherein R⁵ of said –N(R⁵R⁶) is H or hydroxyalkyl, and R⁶ of said –N(R⁵R⁶) is selected from the group consisting of alkyl, hydroxyalkyl, cycloalkyl and methylenedioxy, wherein each of said alkyl and
20 cycloalkyl can be unsubstituted or substituted with one or more moieties which can be the same or different, each moiety being independently selected from the group consisting of amine, ethoxycarbonyl, amide, hydroxyalkyl, hydroxy,
25. The compound of claim 19, wherein R⁵ and R⁶ of said –N(R⁵R⁶) are joined together to form a heterocyclyl moiety, wherein said heterocyclyl moiety can be
25 unsubstituted or optionally independently substituted with one or more groups which can be the same or different, each group being selected from the group consisting of hydroxyalkyl, amide, -C(O)R⁵, >C(CH₃)₂, -S(O₂)R⁵, -S(O₂)N(R⁵R⁶), -C(=NH)N(R⁵R⁶) and –C(=N-CN)N(R⁵R⁶).
26. The compound of claim 25, wherein said heterocyclyl moiety formed by R⁵
30 and R⁶ is a pyrrolidine or piperidine ring.
27. A compound of the formula:

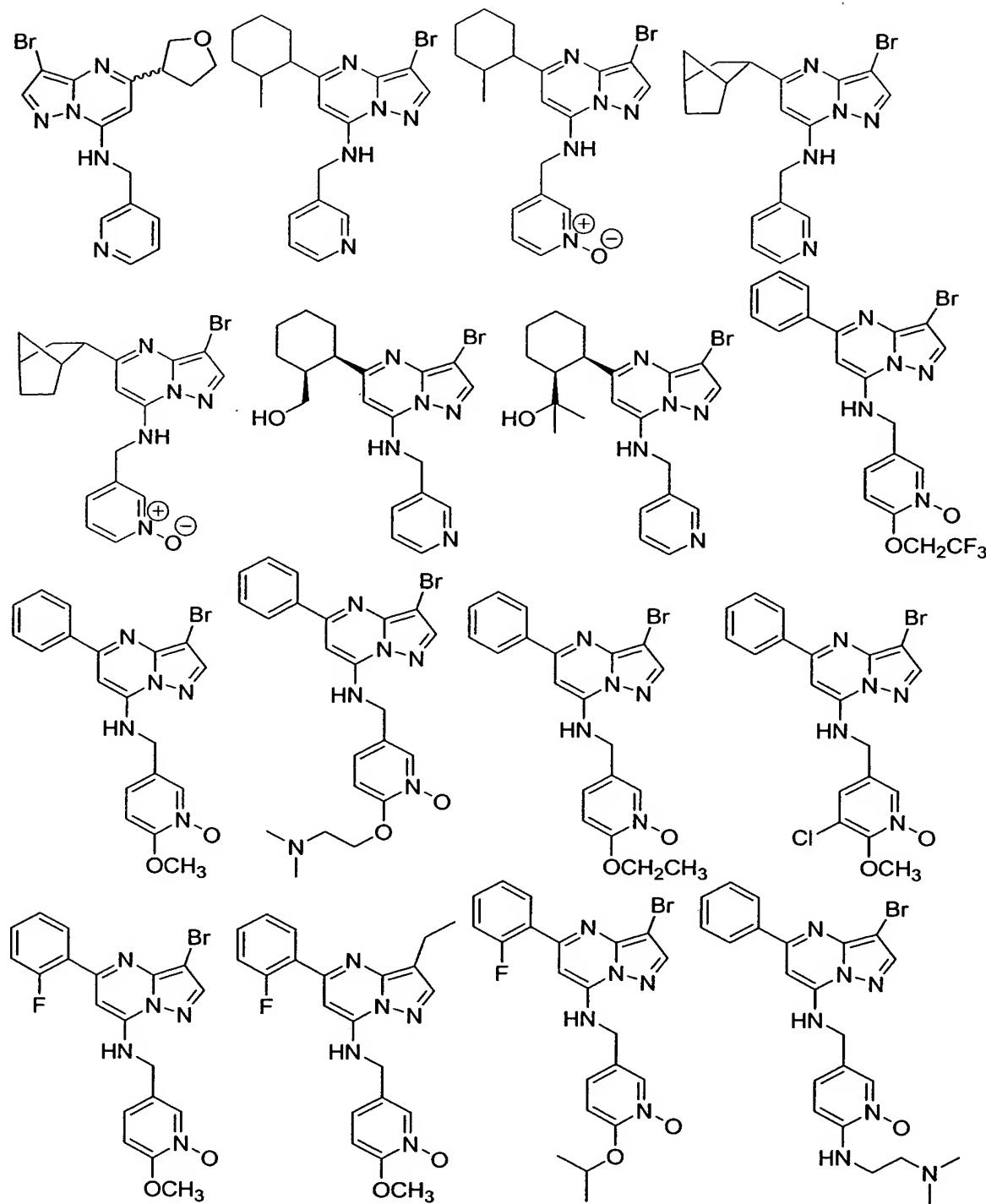


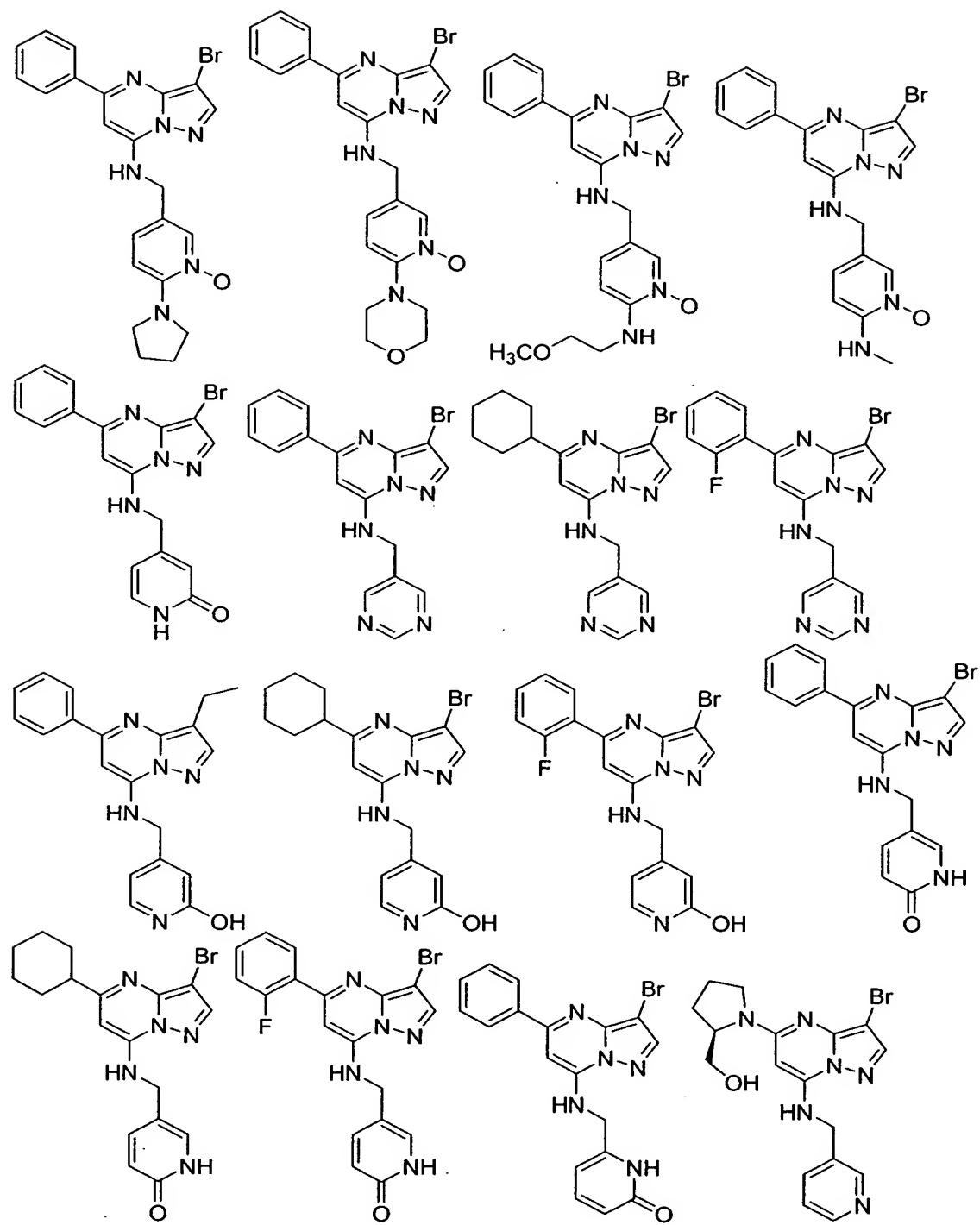


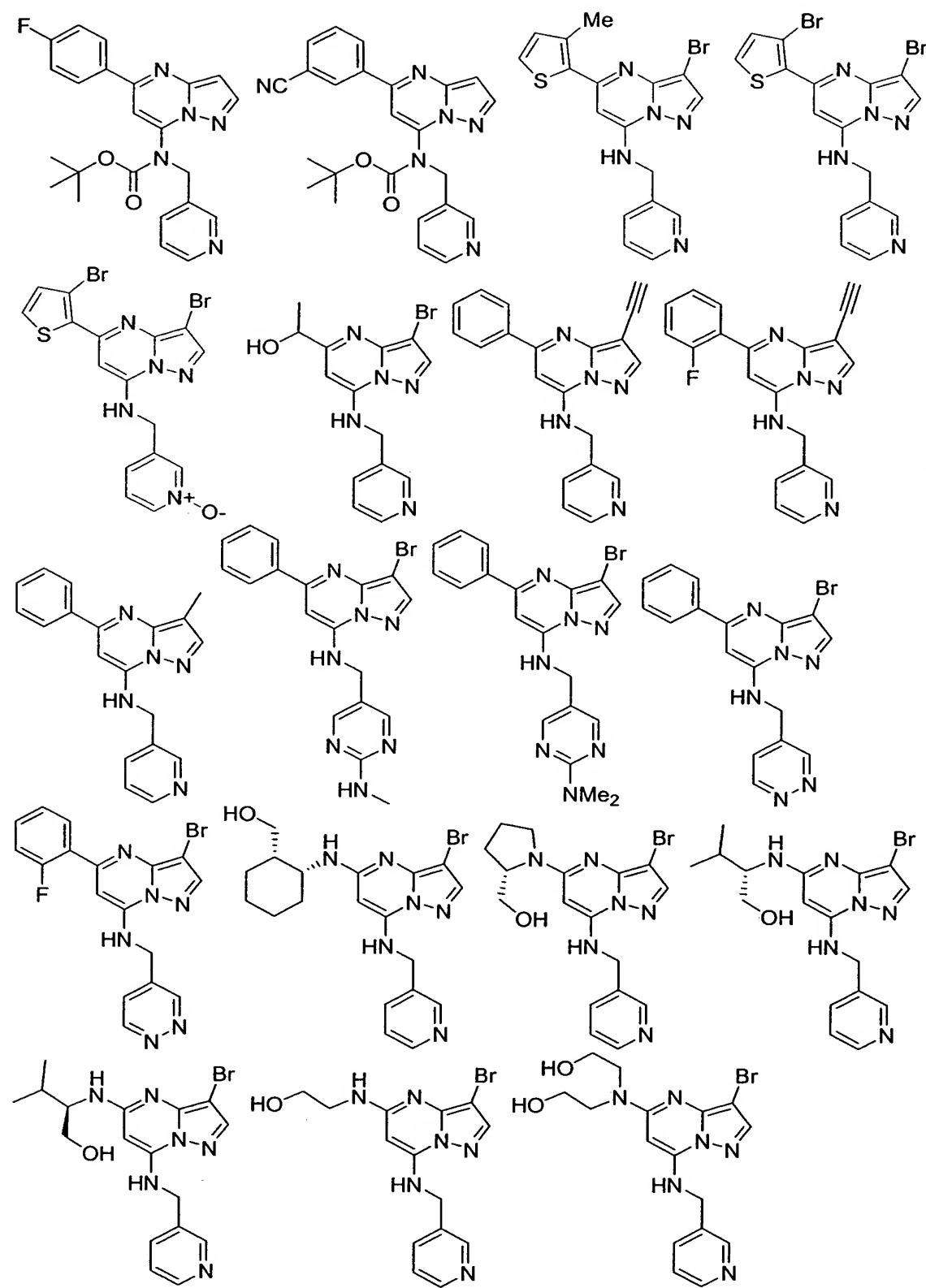


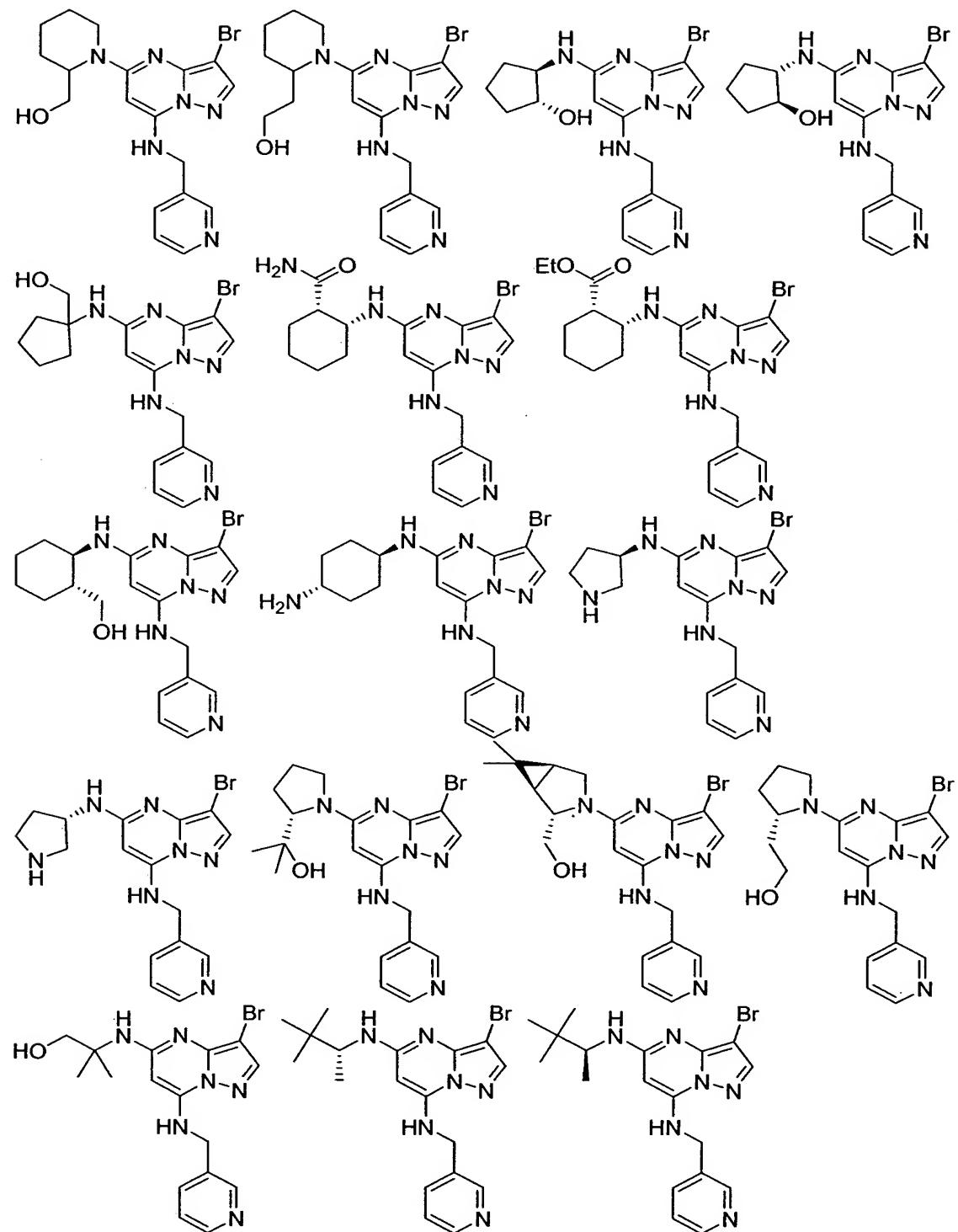


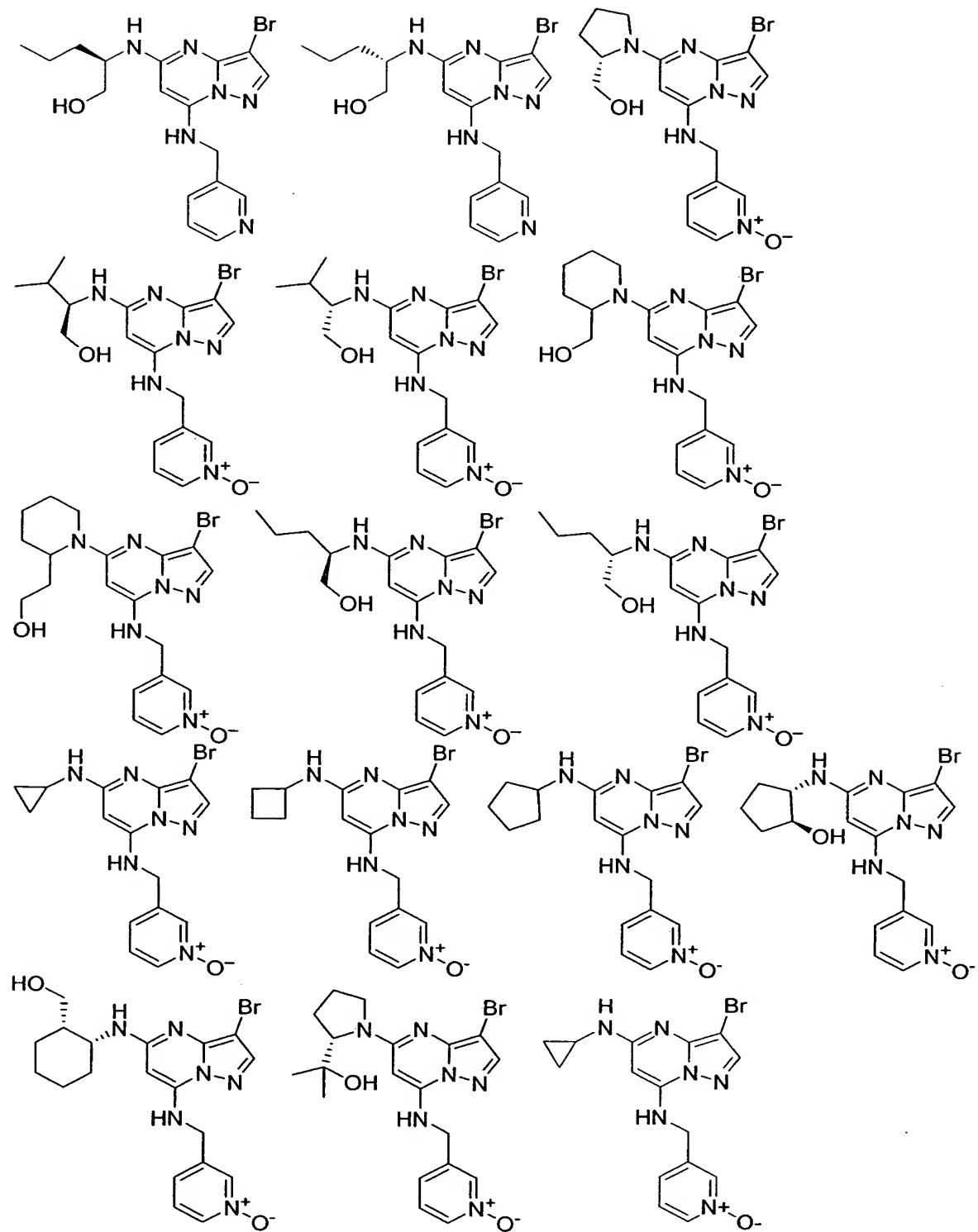


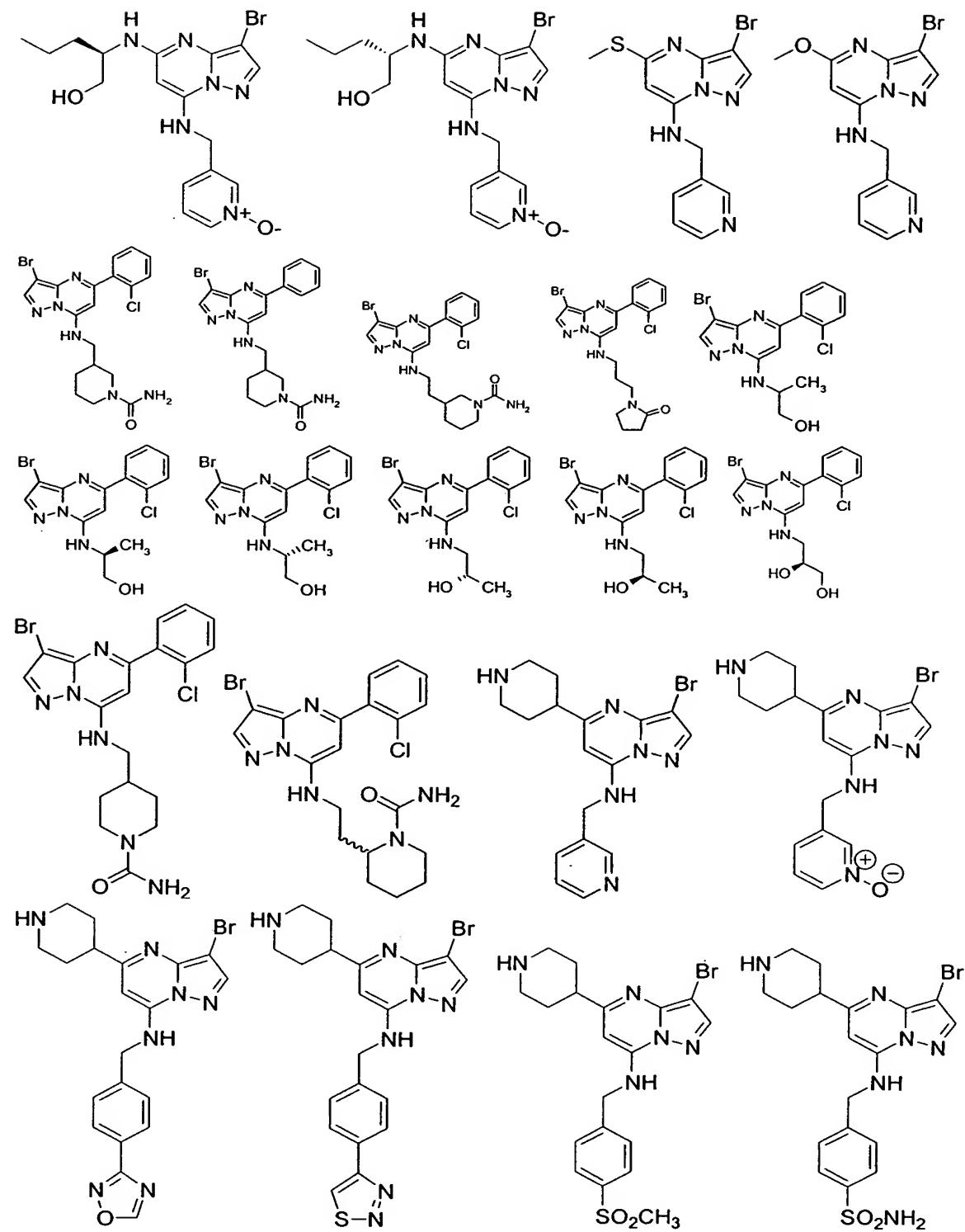


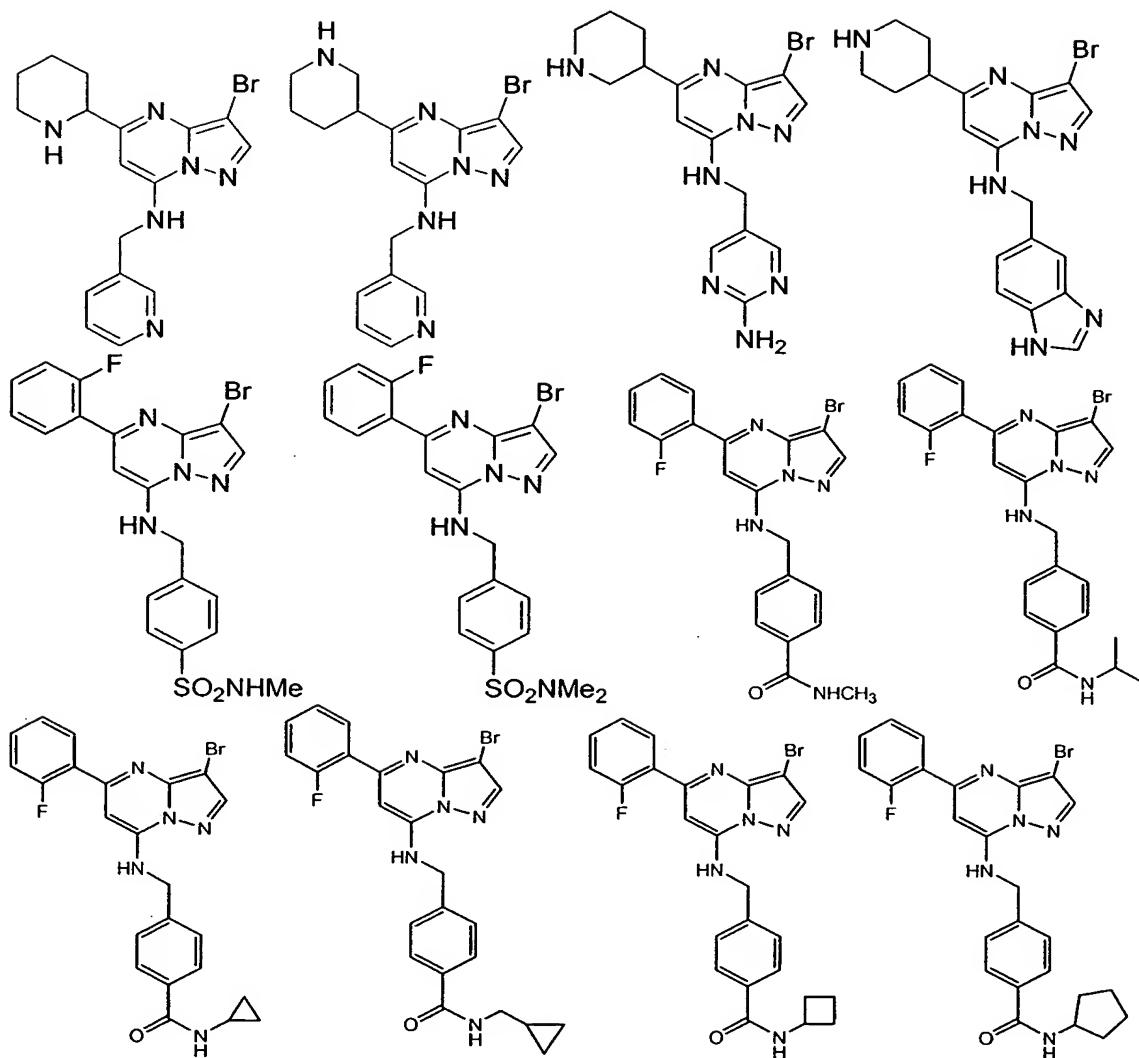


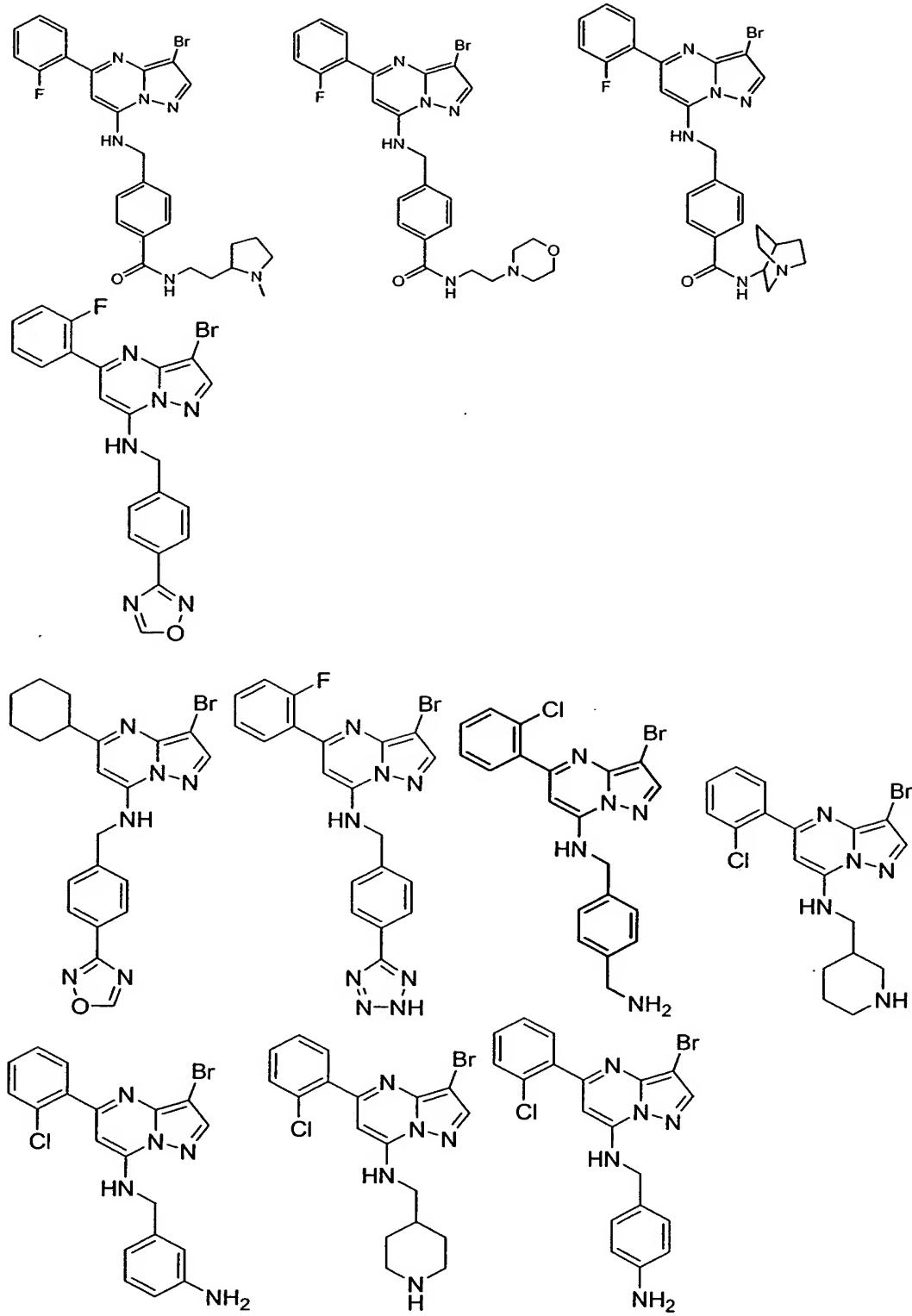


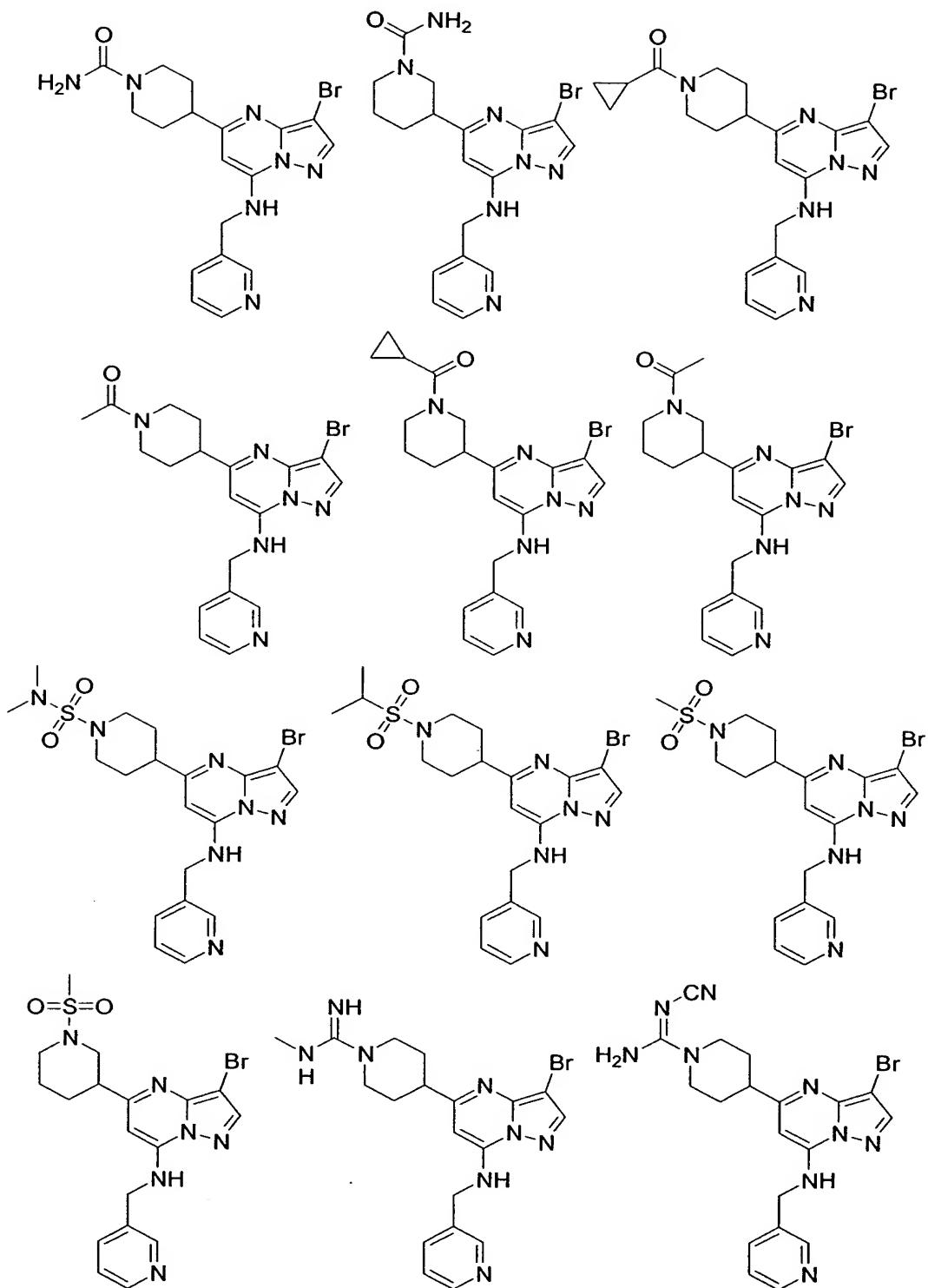


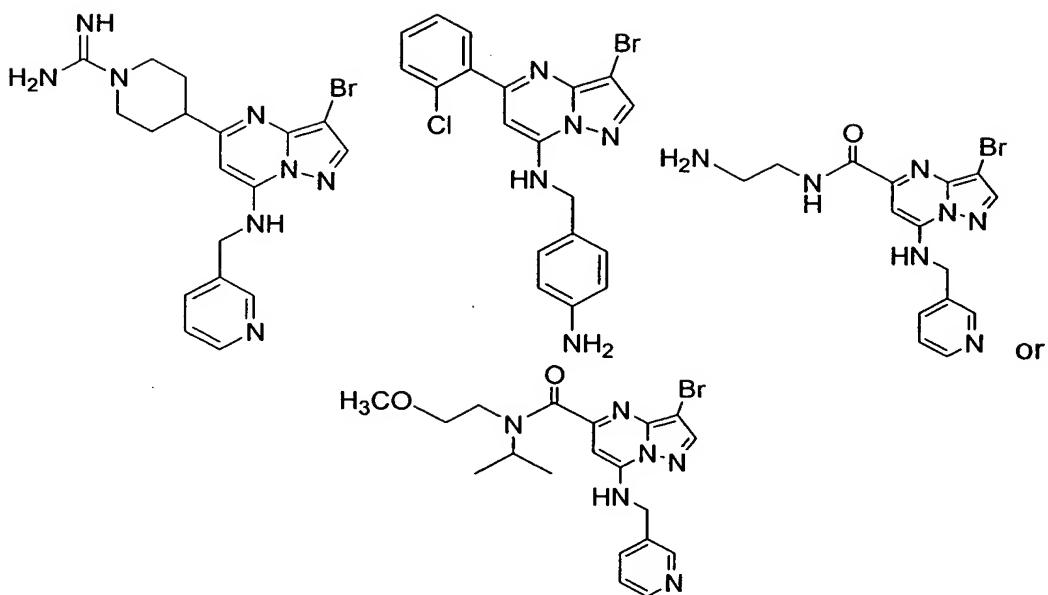






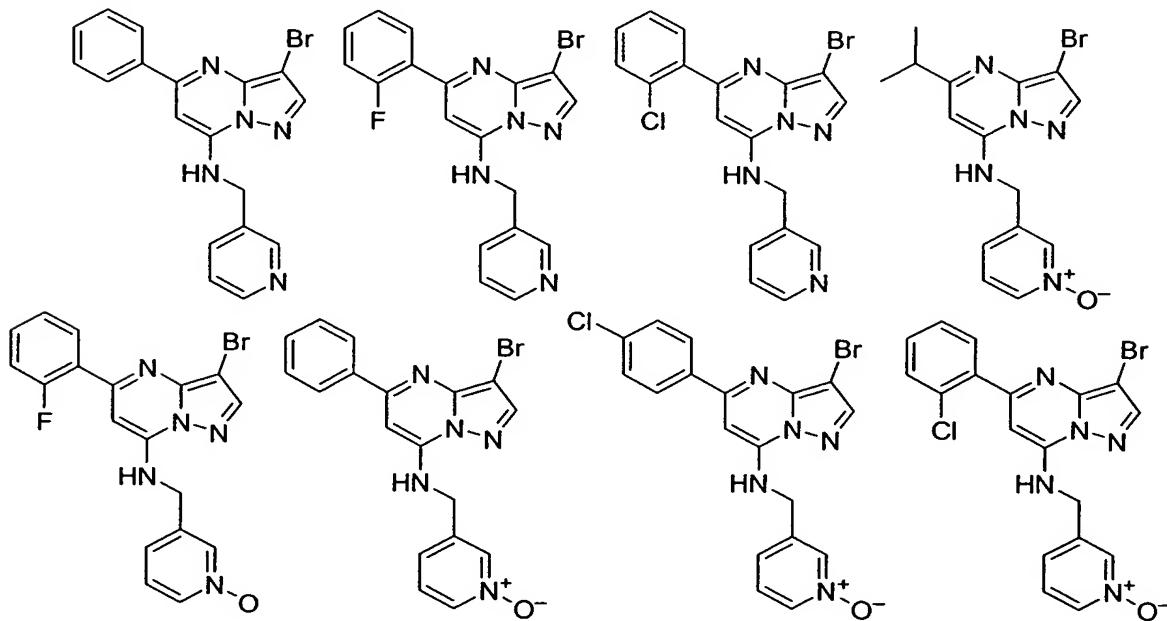


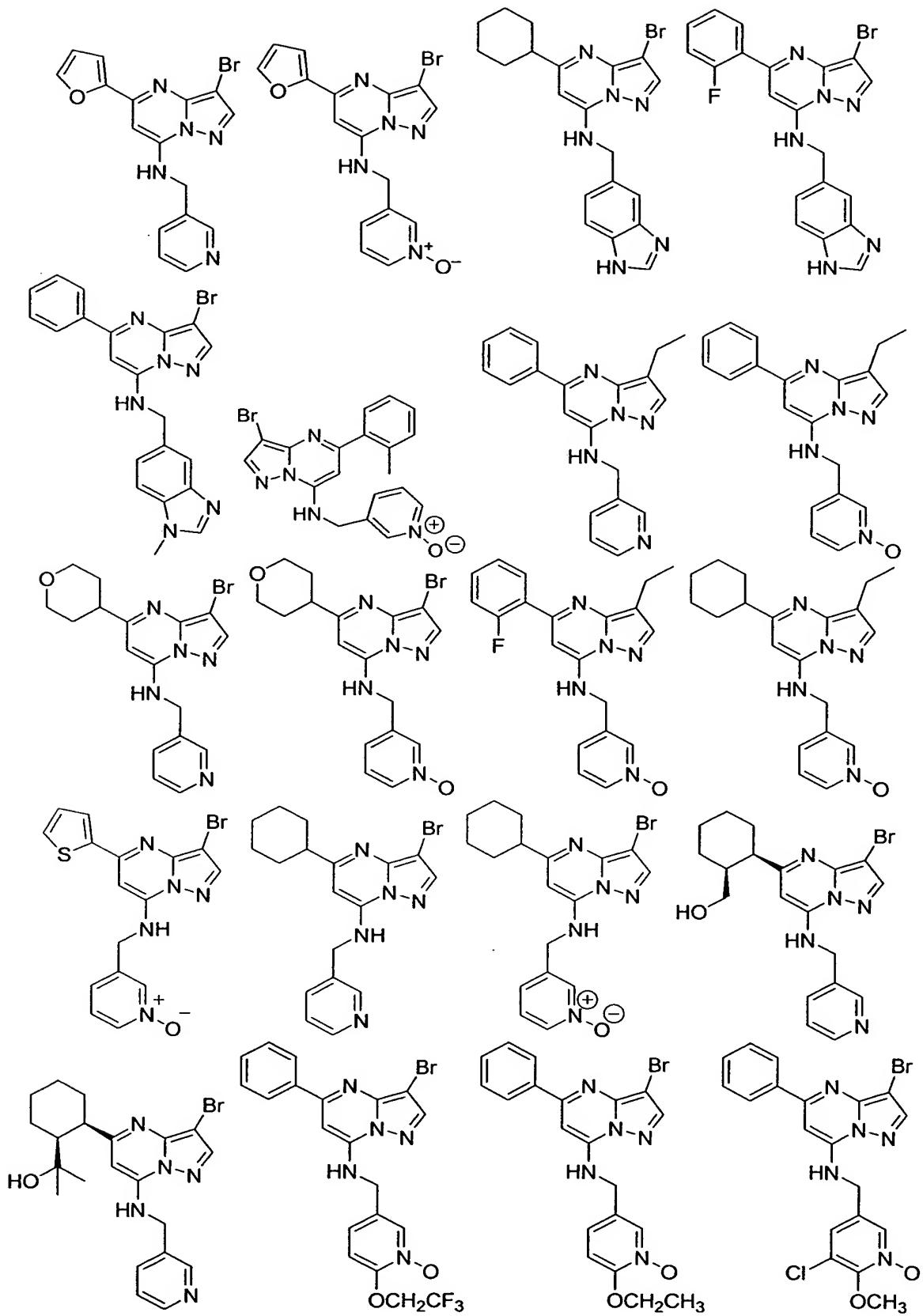


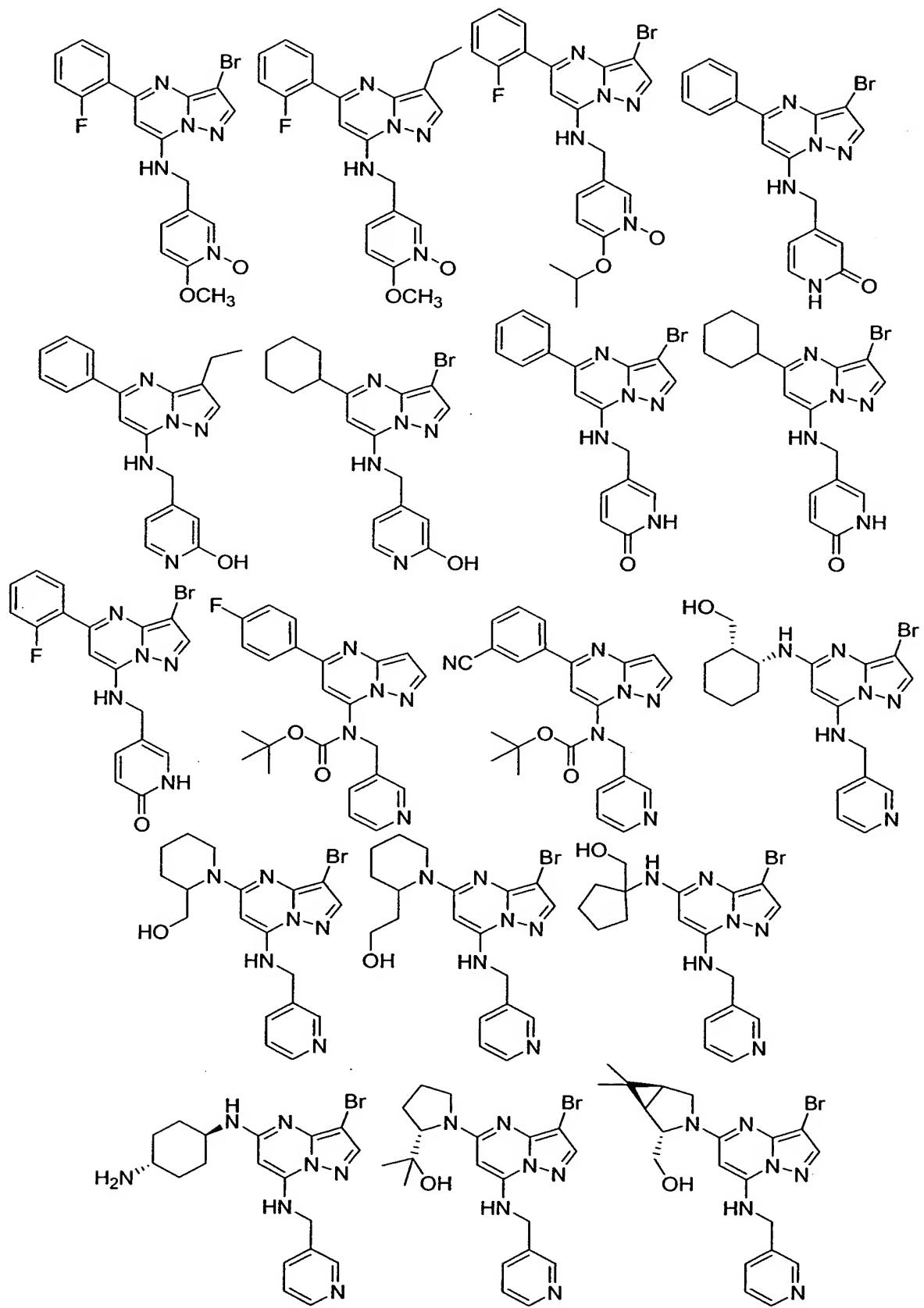


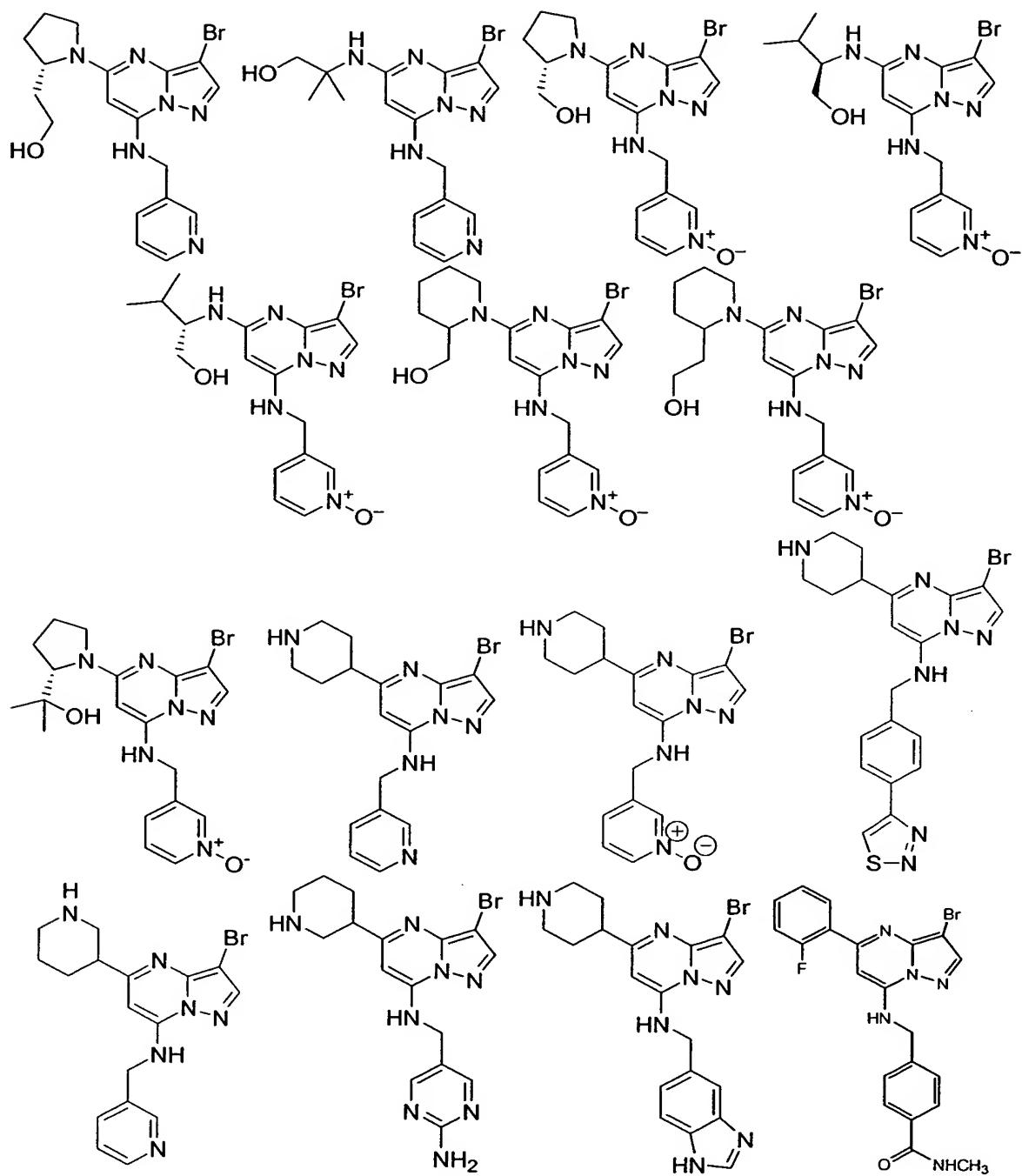
or a pharmaceutically acceptable salt or solvate thereof.

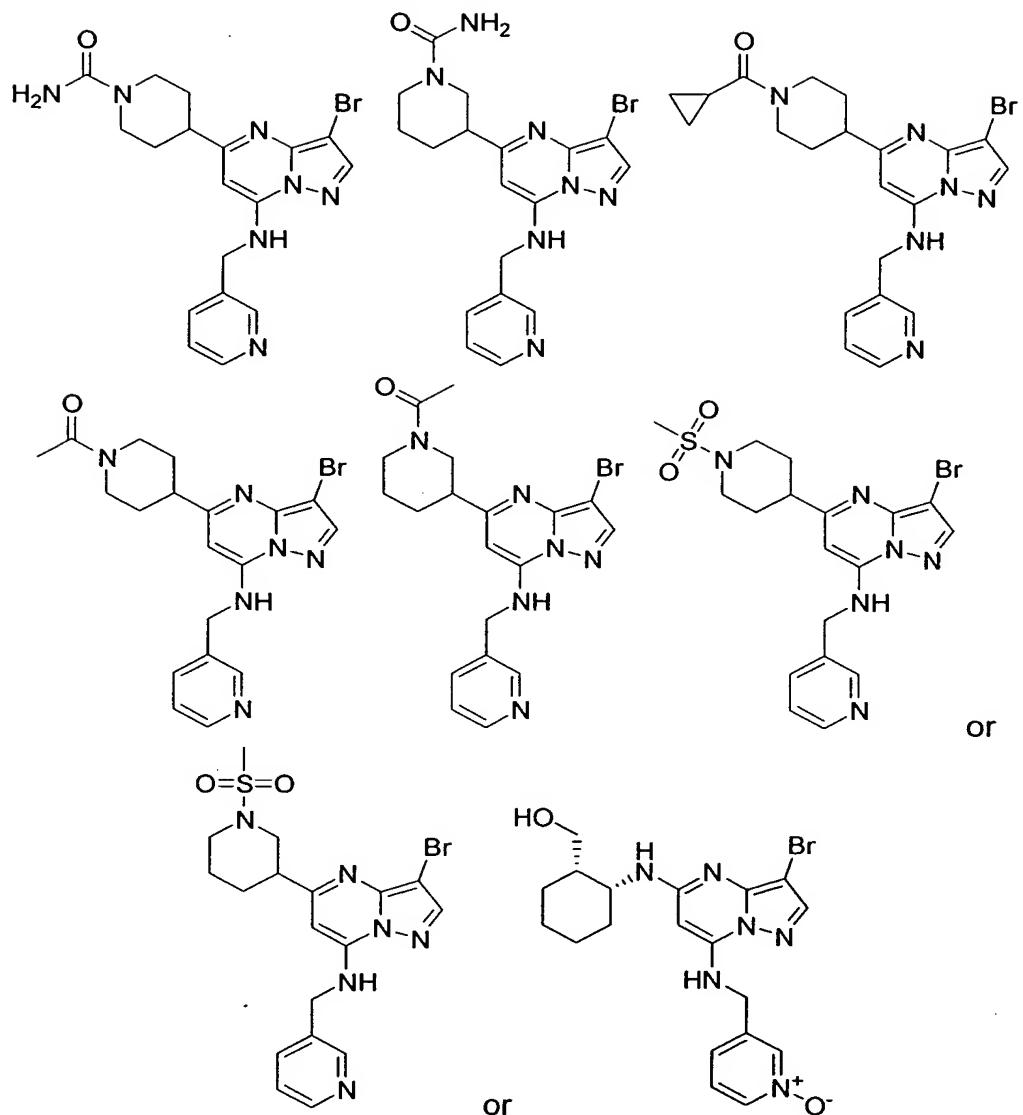
5 28. A compound of the formula:





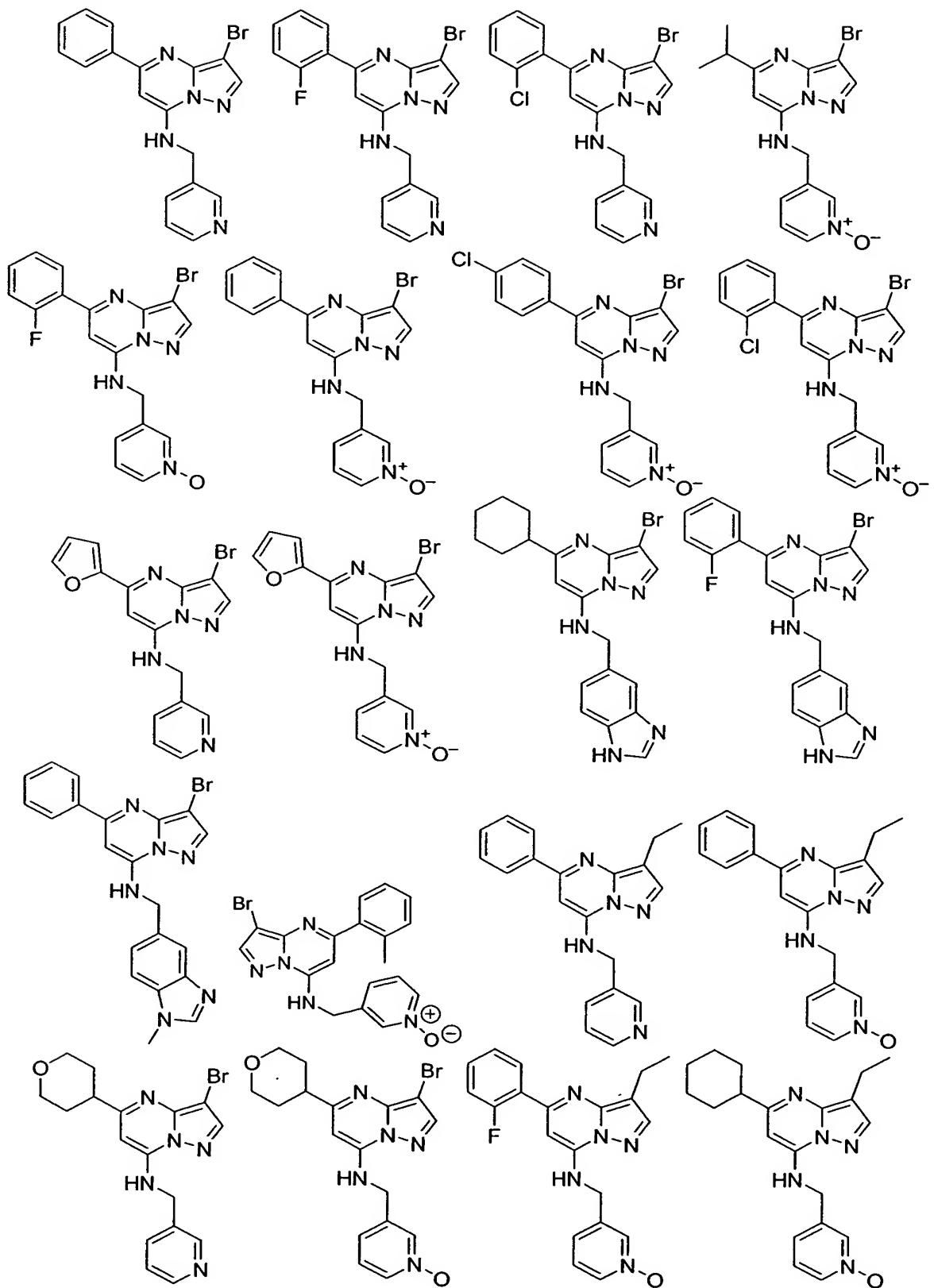


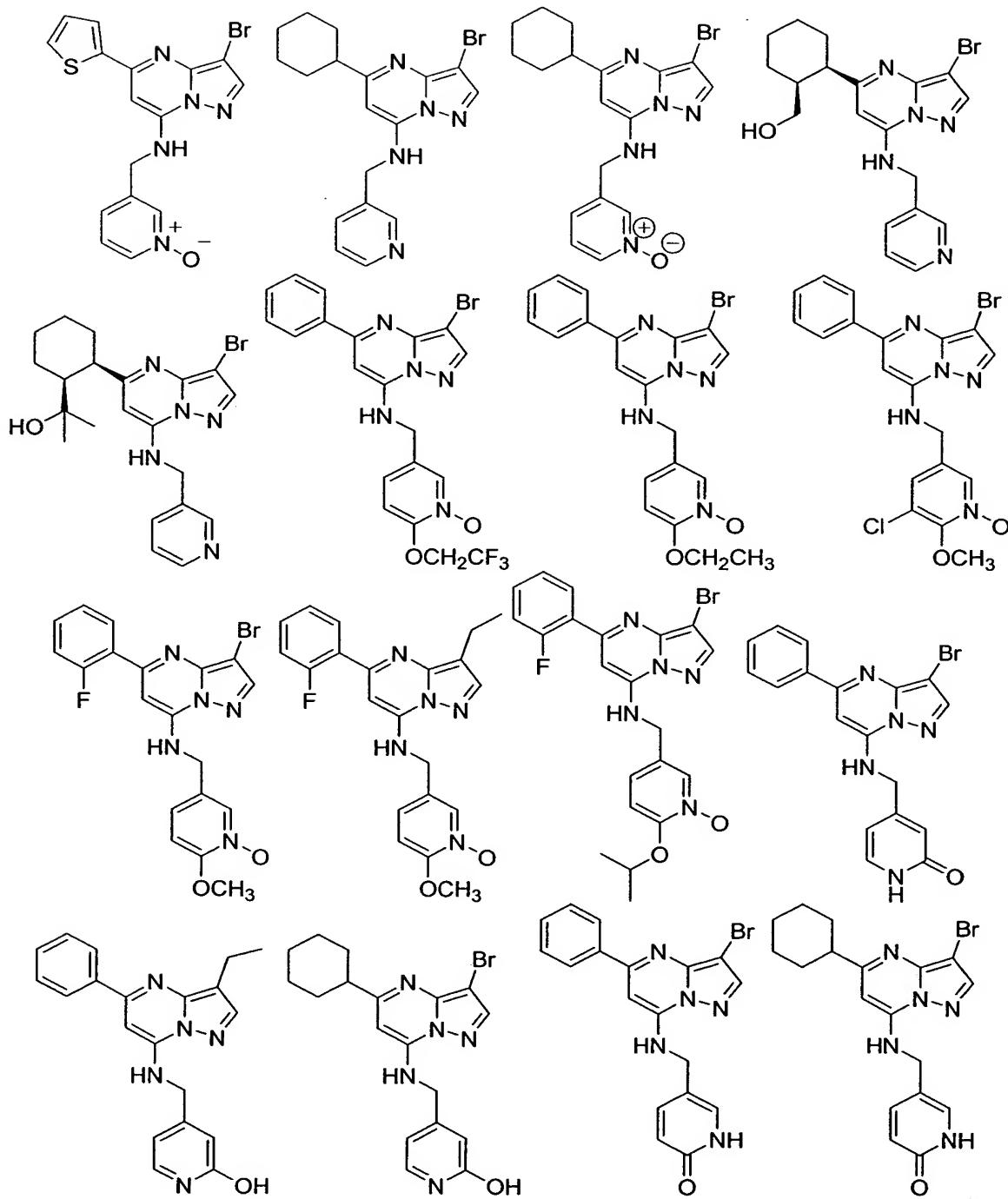


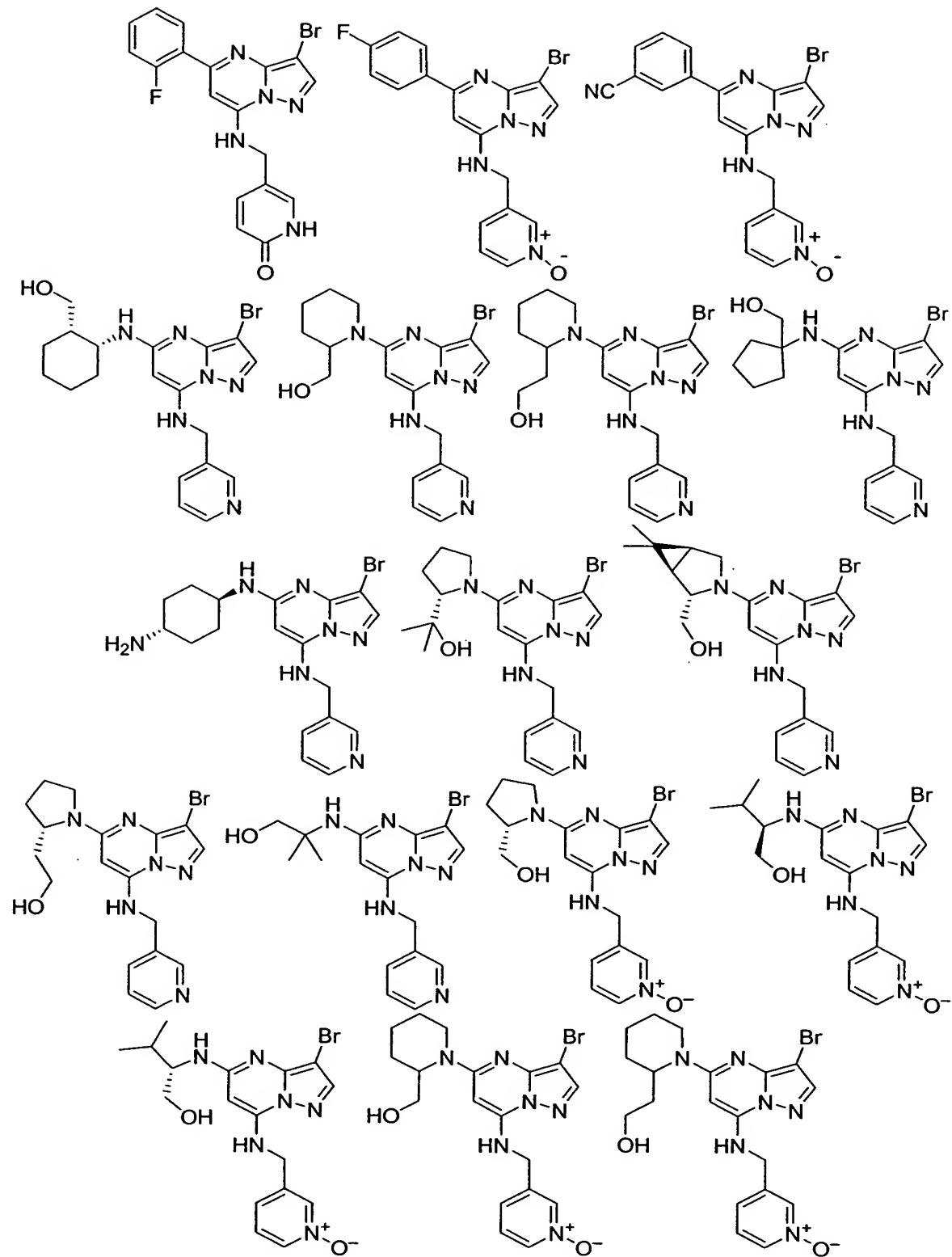


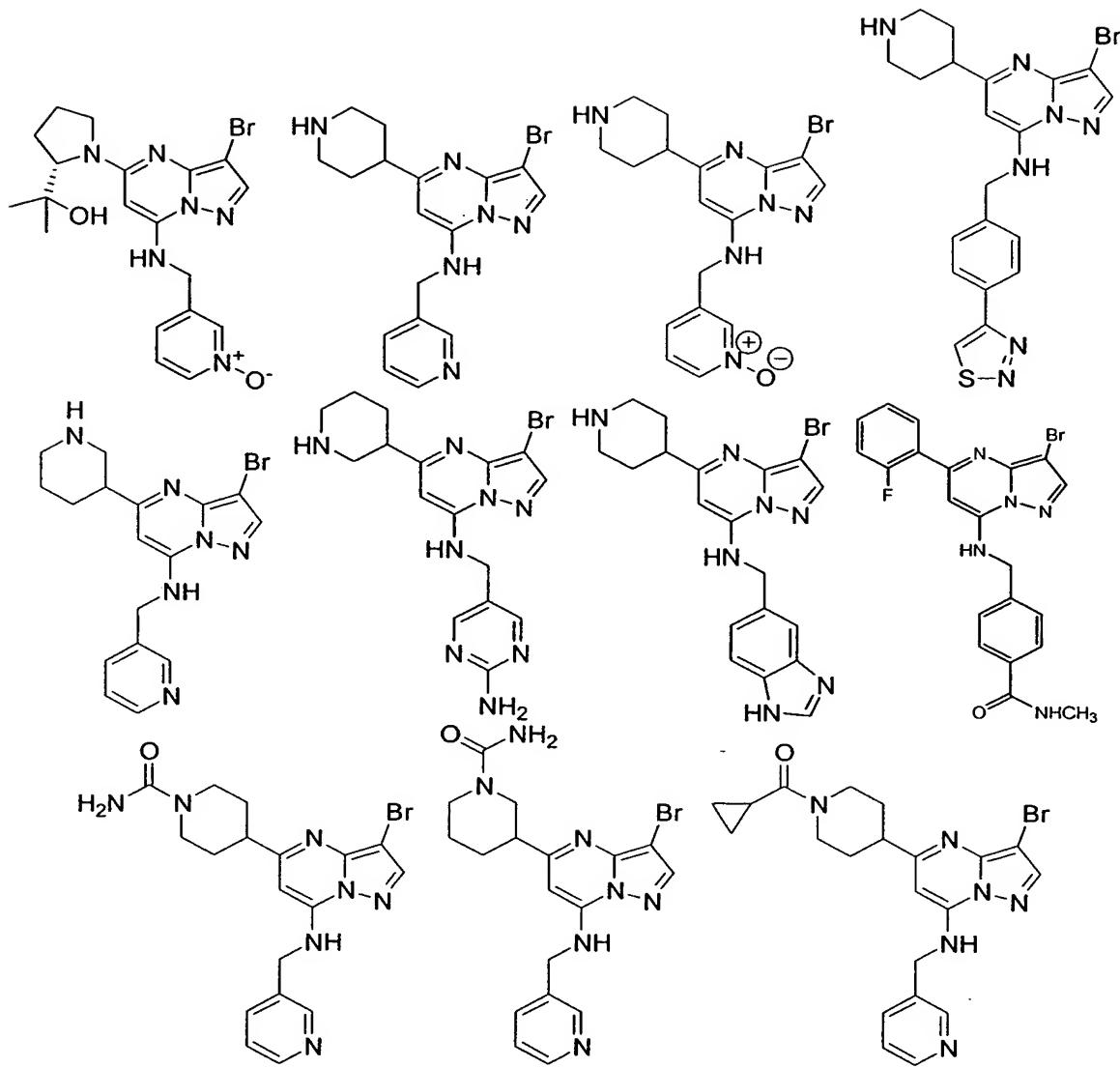
or a pharmaceutically acceptable salt or solvate thereof.

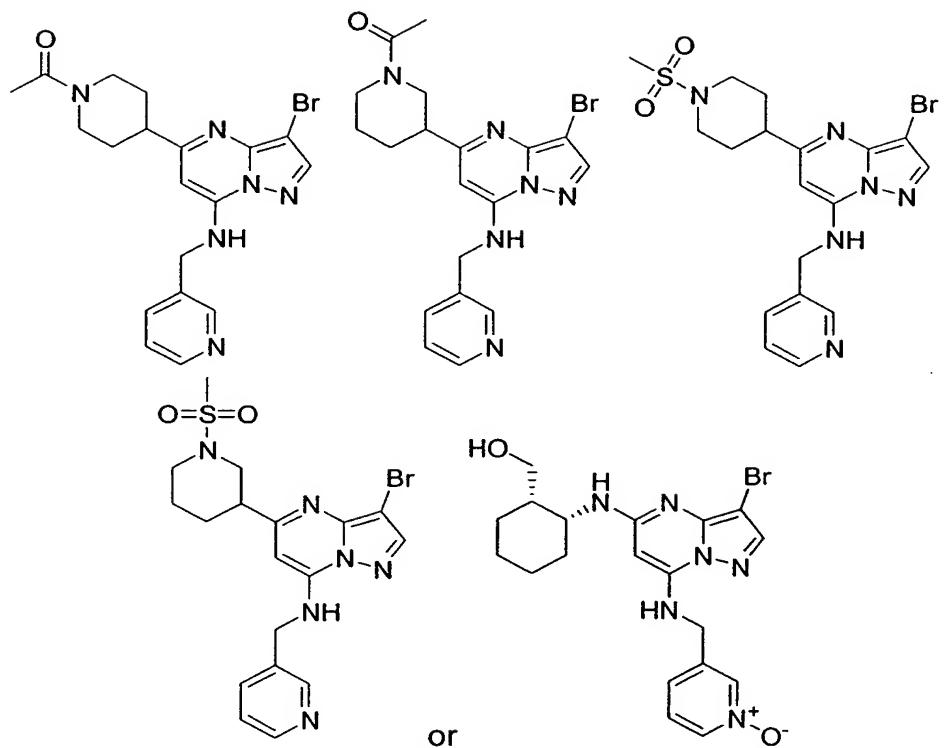
5 29. A compound of the formula:





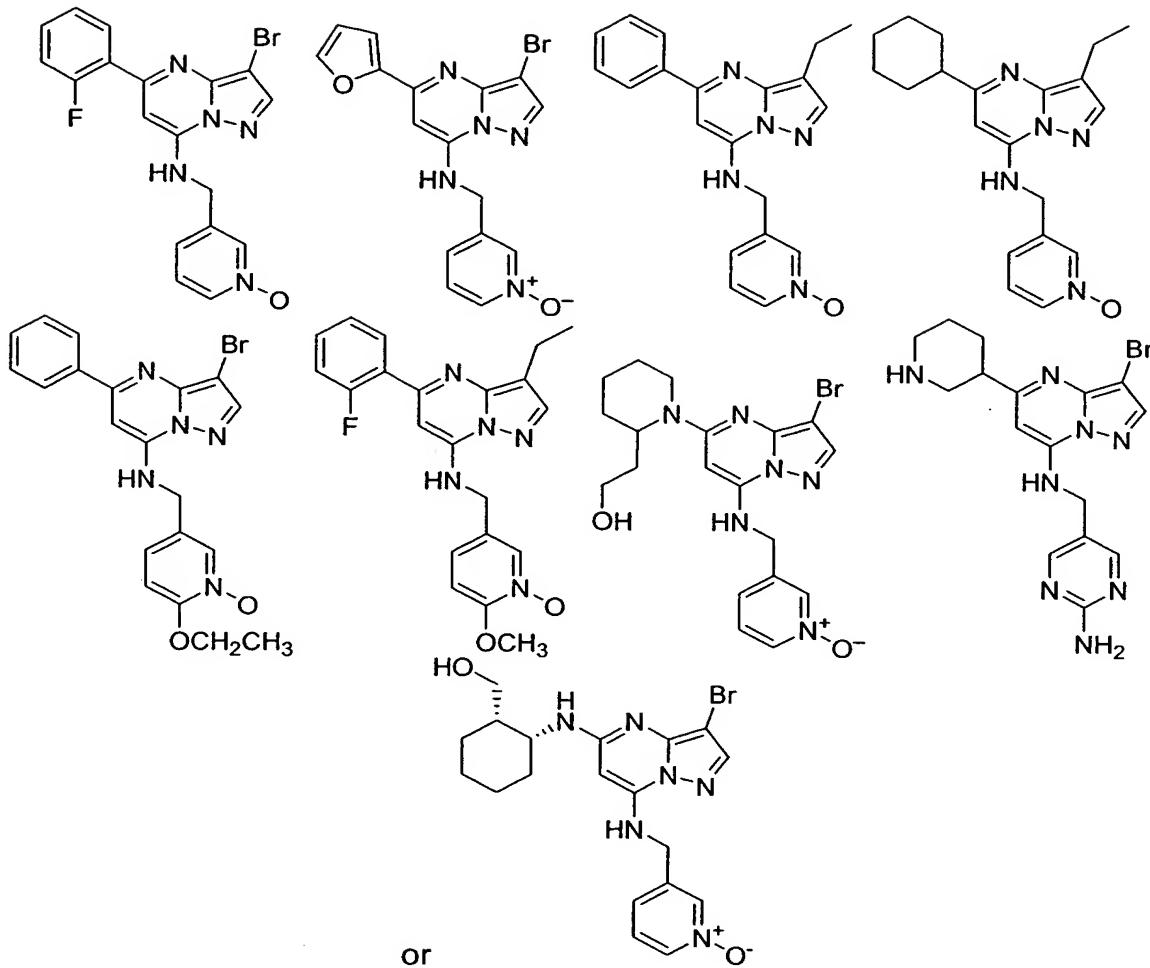






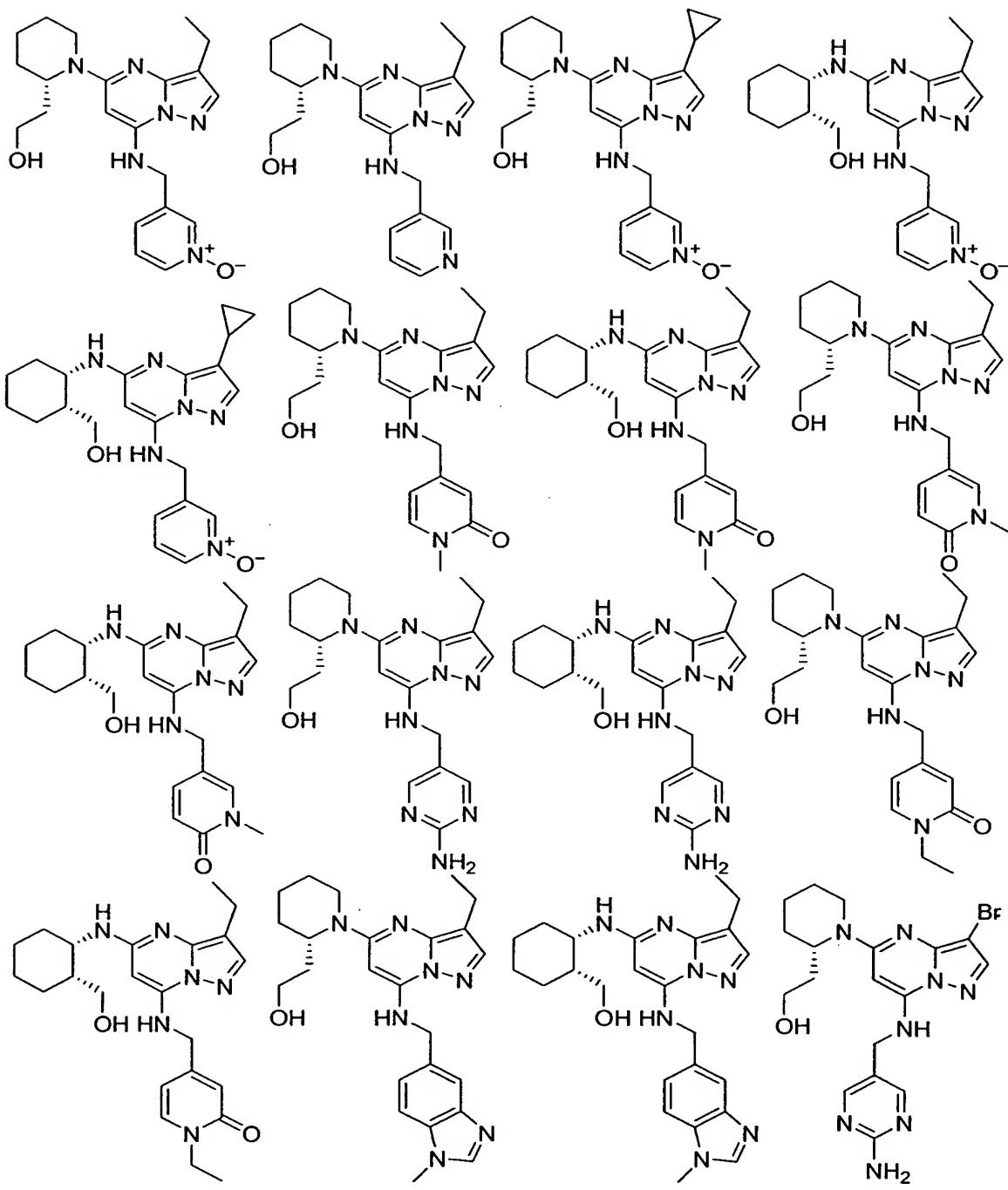
or a pharmaceutically acceptable salt or solvate thereof.

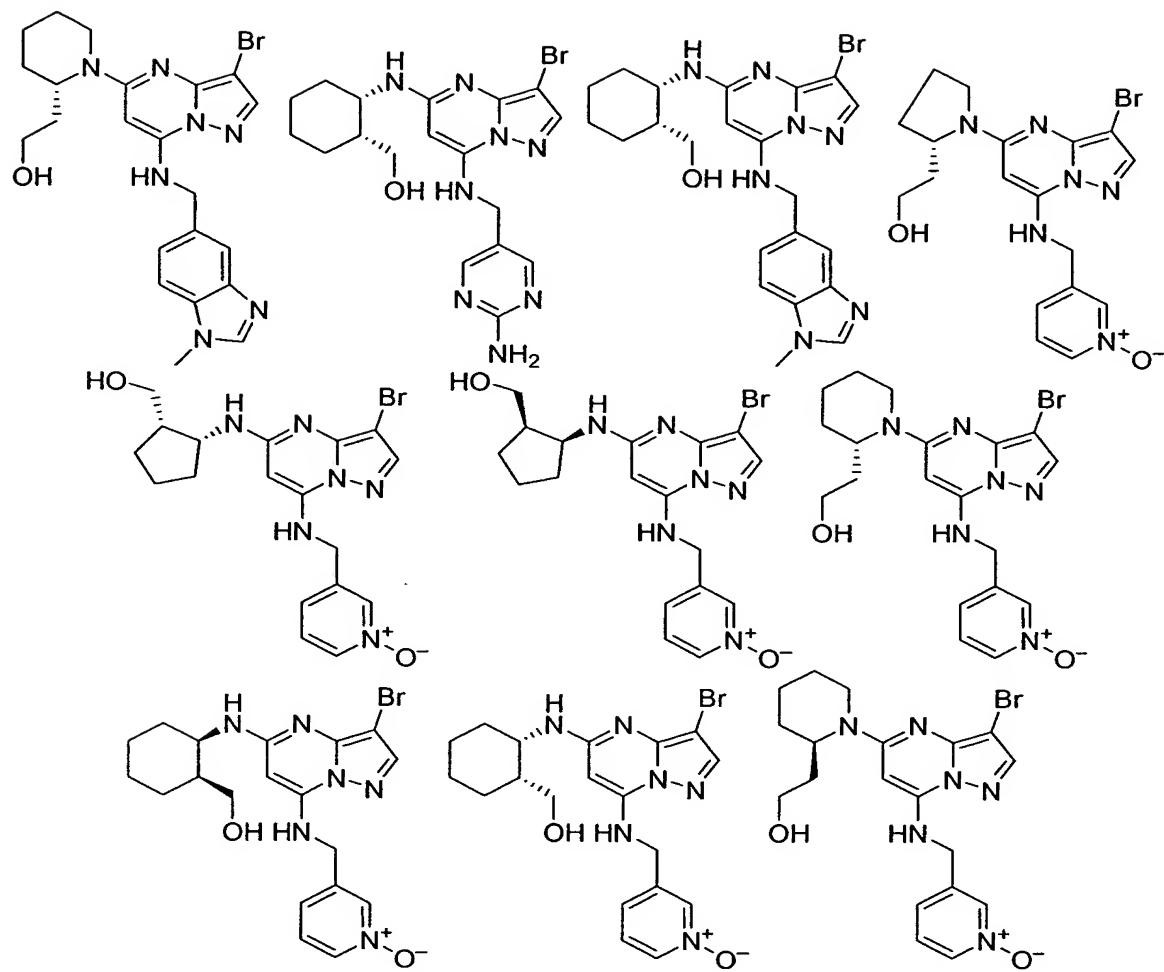
5 30. A compound of the formula:

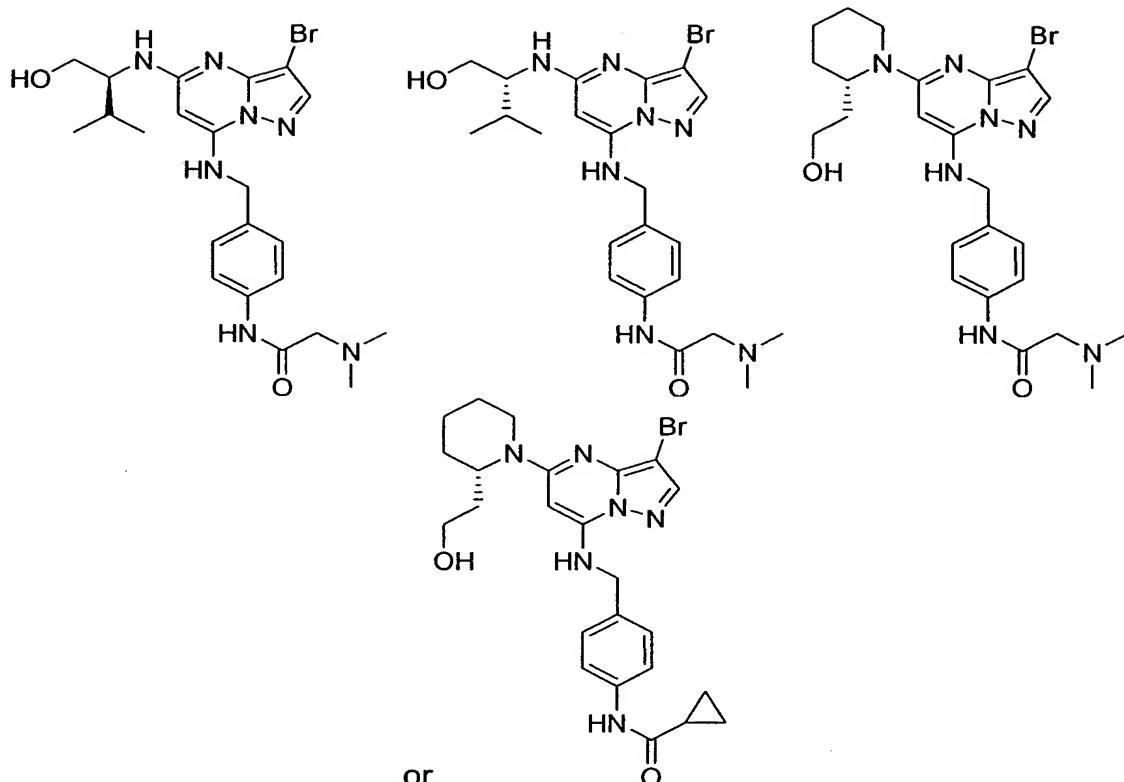


5 or a pharmaceutically acceptable salt or solvate thereof.

31. A compound of the formula:







or a pharmaceutically acceptable salt or solvate thereof.

32. A method of inhibiting one or more cyclin dependent kinases, comprising
 - 5 administering a therapeutically effective amount of at least one compound of claim 1 to a patient in need of such inhibition.
33. A method of treating one or more diseases associated with cyclin dependent kinase, comprising administering a therapeutically effective amount of at least one compound of claim 1 to a patient in need of such treatment.
- 10 34. The method of claim 33, wherein said cyclin dependent kinase is CDK2.
35. The method of claim 33, wherein said cyclin dependent kinase is mitogen activated protein kinase (MAPK/ERK).
36. The method of claim 33, wherein said cyclin dependent kinase is glycogen synthase kinase 3 (GSK3beta).
- 15 37. The method of claim 33, wherein said disease is selected from the group consisting of:
 - cancer of the bladder, breast, colon, kidney, liver, lung, small cell lung cancer, esophagus, gall bladder, ovary, pancreas, stomach, cervix, thyroid, prostate, and skin, including squamous cell carcinoma;

leukemia, acute lymphocytic leukemia, acute lymphoblastic leukemia, B-cell lymphoma, T- cell lymphoma, Hodgkins lymphoma, non-Hodgkins lymphoma, hairy cell lymphoma and Burkett's lymphoma;

acute and chronic myelogenous leukemia, myelodysplastic syndrome and

5 promyelocytic leukemia;

fibrosarcoma, rhabdomyosarcoma;

astrocytoma, neuroblastoma, glioma and schwannomas;

melanoma, seminoma, teratocarcinoma, osteosarcoma, xenoderoma pigmentosum, keratoctanthoma, thyroid follicular cancer and Kaposi's sarcoma.

10 38. A method of treating one or more diseases associated with cyclin dependent kinase, comprising administering to a mammal in need of such treatment

an amount of a first compound, which is a compound of claim 1, or a pharmaceutically acceptable salt or solvate thereof;

15 and

an amount of at least one second compound, said second compound being an anti-cancer agent;

wherein the amounts of the first compound and said second compound result in a therapeutic effect.

20 39. The method of claim 38, further comprising radiation therapy.

40. The method of claim 38, wherein said anti-cancer agent is selected from the group consisting of a cytostatic agent, cisplatin, doxorubicin, taxotere, taxol, etoposide, CPT-11, irinotecan, camptostar, topotecan, paclitaxel, docetaxel, epothilones, tamoxifen, 5-fluorouracil, methotrexate, 5FU, temozolomide,

25 cyclophosphamide, SCH 66336, R115777, L778,123, BMS 214662, Iressa, Tarceva, antibodies to EGFR, Gleevec, intron, ara-C, adriamycin, cytoxan, gemcitabine, Uracil mustard, Chlormethine, Ifosfamide, Melphalan, Chlorambucil, Pipobroman, Triethylenemelamine, Triethylenethiophosphoramine, Busulfan, Carmustine, Lomustine, Streptozocin,

30 Dacarbazine, Floxuridine, Cytarabine, 6-Mercaptoperine, 6-Thioguanine, Fludarabine phosphate, oxaliplatin, leucovirin, ELOXATIN™, Pentostatine, Vinblastine, Vincristine, Vindesine, Bleomycin, Dactinomycin, Daunorubicin,

Doxorubicin, Epirubicin, Idarubicin, Mithramycin, Deoxycoformycin, Mitomycin-C, L-Asparaginase, Teniposide 17 α -Ethinylestradiol, Diethylstilbestrol,

Testosterone, Prednisone, Fluoxymesterone, Dromostanolone propionate, Testolactone, Megestrolacetate, Methylprednisolone, Methyltestosterone,

5 Prednisolone, Triamcinolone, Chlorotrianisene, Hydroxyprogesterone, Aminoglutethimide, Estramustine, Medroxyprogesteroneacetate, Leuprolide, Flutamide, Toremifene, goserelin, Cisplatin, Carboplatin, Hydroxyurea, Amsacrine, Procarbazine, Mitotane, Mitoxantrone, Levamisole, Navelbene, CPT-11, Anastrazole, Letrazole, Capecitabine, Reloxafine, Droloxafine, or
10 Hexamethylmelamine..

41. A pharmaceutical composition comprising a therapeutically effective amount of at least one compound of claim 1 in combination with at least one pharmaceutically acceptable carrier.

42. The pharmaceutical composition of claim 39, additionally comprising one

15 or more anti-cancer agents selected from the group consisting of cytostatic agent, cisplatin, doxorubicin, taxotere, taxol, etoposide, CPT-11, irinotecan, camptostar, topotecan, paclitaxel, docetaxel, epothilones, tamoxifen, 5-fluorouracil, methotrexate, 5FU, temozolomide, cyclophosphamide, SCH 66336, R115777, L778,123, BMS 214662, Iressa, Tarceva, antibodies to EGFR,

20 Gleevec, intron; ara-C, adriamycin, cytoxan, gemcitabine, Uracil mustard, Chlormethine, Ifosfamide, Melphalan, Chlorambucil, Pipobroman, Triethylenemelamine, Triethylenethiophosphoramine, Busulfan, Carmustine, Lomustine, Streptozocin, Dacarbazine, Floxuridine, Cytarabine, 6-Mercaptopurine, 6-Thioguanine, Fludarabine phosphate, Pentostatine,

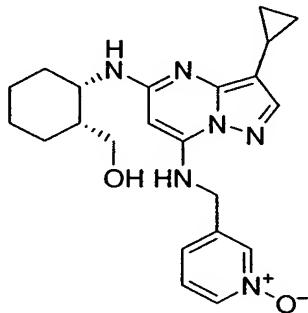
25 Vinblastine, Vincristine, Vindesine, Bleomycin, Dactinomycin, Daunorubicin, Doxorubicin, Epirubicin, Idarubicin, Mithramycin, Deoxycoformycin, Mitomycin-C, L-Asparaginase, Teniposide 17 α -Ethinylestradiol, Diethylstilbestrol, Testosterone, Prednisone, Fluoxymesterone, Dromostanolone propionate, Testolactone, Megestrolacetate, Methylprednisolone, Methyltestosterone,

30 Prednisolone, Triamcinolone, Chlorotrianisene, Hydroxyprogesterone, Aminoglutethimide, Estramustine, Medroxyprogesteroneacetate, Leuprolide, Flutamide, Toremifene, goserelin, Cisplatin, Carboplatin, Hydroxyurea,

Amsacrine, Procarbazine, Mitotane, Mitoxantrone, Levamisole, Navelbine, CPT-11, Anastrazole, Letrazole, Capecitabine, Reloxafine, Droloxafine, or Hexamethylmelamine.

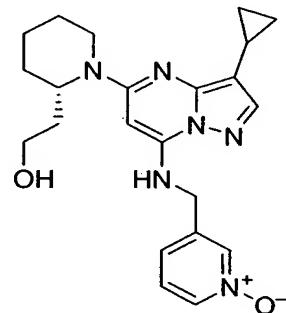
43. A compound of claim 1 in purified form.

5 44. A compound of the formula:



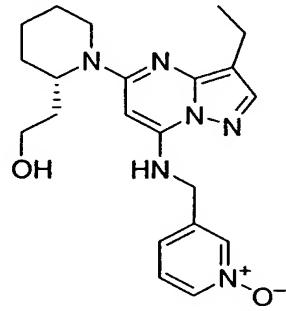
or a pharmaceutically acceptable salt or solvate thereof.

45. A compound of the formula:



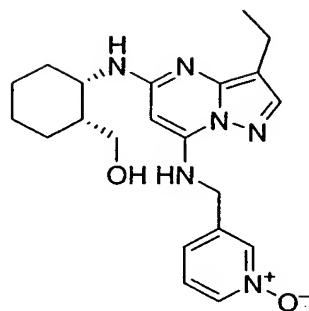
10 or a pharmaceutically acceptable salt or solvate thereof.

46. A compound of the formula:



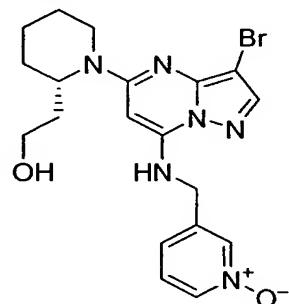
or a pharmaceutically acceptable salt or solvate thereof.

47. A compound of the formula:



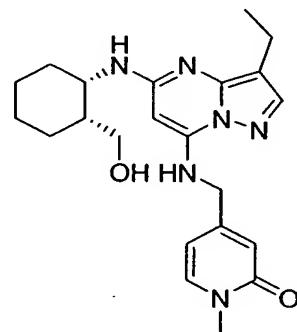
or a pharmaceutically acceptable salt or solvate thereof.

48. A compound of the formula:



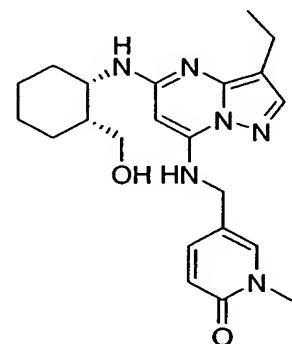
5 or a pharmaceutically acceptable salt or solvate thereof.

49. A compound of the formula:



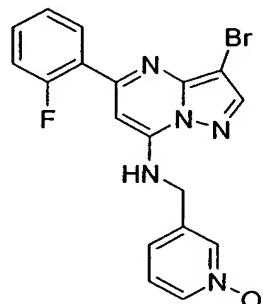
or a pharmaceutically acceptable salt or solvate thereof.

50. A compound of the formula:



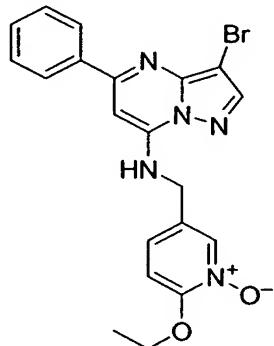
or a pharmaceutically acceptable salt or solvate thereof.

51. A compound of the formula:



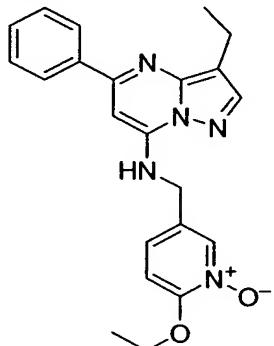
or a pharmaceutically acceptable salt or solvate thereof.

5 52. A compound of the formula:



or a pharmaceutically acceptable salt or solvate thereof.

53. A compound of the formula:



10 or a pharmaceutically acceptable salt or solvate thereof.